THE EFFECTS OF CHANGES IN LABOUR LEGISLATION ON STRIKE ACTIVITY IN BRITISH COLUMBIA: 1945-75

by

Edward G. FISHER
B.A., University of Colorado, 1967
M.A., Indiana University, 1970

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF DOCTOR OF PHILOSOPHY in
THE FACULTY OF GRADUATE STUDIES in the Department of ECONOMICS

We accept this thesis as conforming to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA
March, 1979
© Edward G. Fisher, 1979
In presenting this thesis in partial fulfilment of the requirements for an advanced degree at the University of British Columbia, I agree that the Library shall make it freely available for reference and study. I further agree that permission for extensive copying of this thesis for scholarly purposes may be granted by the Head of my Department or by his representatives. It is understood that publication, in part or in whole, or the copying of this thesis for financial gain shall not be allowed without my written permission.

Department of Economics

The University of British Columbia,
Vancouver, Canada V6T 1W5

Date 30 March 1974
ABSTRACT

This dissertation studies the effects of changes in labour legislation on strike activity in British Columbia during 1945-75. It develops two theories of strike activity and uses regression analysis where dummy variables model the effects of changes in labour legislation on strike activity. The two theories suggested economic determinants of strike activity which were used in the regression analysis.

One theory, a strike-as-an-investment theory of bargaining under uncertainty, is applied to first agreement strikes and to contract renewal strikes. The other theory, a "pressure-valve theory" which envisages strikes as means for releasing pent-up frustrations, is applied to strikes during the term. Both theories build upon the theories that preceded them but modify their predecessors. For instance, each theory yields an economic determinant of strike activity that was not derived explicitly from the theories that preceded it.

Methodologically, this research project departs in at least four ways from the research project it most closely resembles: the 1969 study by Ashenfelter and Johnson of the labour law-strike relationship in the United States. First, strike activity is classified by contract status: first agreement, contract renewal and during the term. Second, a different set of economic determinants is applied to strikes during the term, as opposed to strikes that issue from interest disputes. That is, the two theories suggest different sets of economic determinants. Third, contract expiry data were gathered and used to construct incidence measures of strike activity, such as the ratio of contract renewal strikes to expiries. (Incidence measures are empirical estimates of
the probability that strikes will take place.) Fourth, not just one, but two hypotheses are tested concerning the effects of changes in labour legislation on strike activity. One hypothesis, the conventional hypothesis, tests whether or not the level of strike activity changes while the new statute is in force. The other hypothesis tests whether or not one- or two-year changes in the level of strike activity accompany statutory change. In addition, actual profit data were gathered and used as an indicator of firms' "ability to pay" and/or their ability to withstand strikes.

It is inferred from the regression results that changes in labour legislation had some effect on strike activity. However, statistically significant effects were not obtained for the theoretically most appealing strike measures-incidence measures. There is some evidence that recent labour acts of British Columbia were associated with a relative decline in the number of strikes--particularly of strikes during the term and contract renewal strikes. These statutes were less interventionist, less adjudicative and, in practice, less punitive than former acts of British Columbia. Subjective assessments indicate, in particular, that there need not be a causal relationship between changes in labour legislation and the perceived decline in wild-cat strikes.
TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>(i)</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>(iii)</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>(viii)</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>(xi)</td>
</tr>
<tr>
<td>NOMENCLATURE</td>
<td>(xii)</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>(xiv)</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Chapter</td>
<td></td>
</tr>
<tr>
<td>1. A REVIEW OF THE EMPIRICAL LITERATURE CONCERNING STRIKE ACTIVITY AND LABOUR LEGISLATION</td>
<td>7</td>
</tr>
<tr>
<td>1.1 Studies Using Regression Analysis</td>
<td>8</td>
</tr>
<tr>
<td>1.2 Studies of Regional Patterns and Regional Determinants of Strike Activity</td>
<td>10</td>
</tr>
<tr>
<td>1.3 Studies Using Measures of the Incidence of Strike and the Strike Expiry</td>
<td>10</td>
</tr>
<tr>
<td>1.4 Studies Where Strike Data were Disaggregated by Contract Status</td>
<td>13</td>
</tr>
<tr>
<td>1.5 Studies of the Relative Impact of Voluntary Versus Compulsory Modes of Dispute Resolution</td>
<td>14</td>
</tr>
<tr>
<td>1.6 Conclusion</td>
<td>16</td>
</tr>
</tbody>
</table>
### Chapter 2

2. A STRIKE-AS-AN-INVESTMENT THEORY OF BARGAINING UNDER UNCERTAINTY.

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 The Basic Framework</td>
<td>19</td>
</tr>
<tr>
<td>2.2 The Firm</td>
<td>23</td>
</tr>
<tr>
<td>2.3 The Union</td>
<td>31</td>
</tr>
<tr>
<td>2.4 Features of the Two Objective Functions</td>
<td>37</td>
</tr>
<tr>
<td>2.5 Feasible Sets</td>
<td>38</td>
</tr>
<tr>
<td>2.6 The Subjective Joint Probability Density Functions</td>
<td>41</td>
</tr>
<tr>
<td>2.7 The Basic Shapes of the p.d.f.s</td>
<td>45</td>
</tr>
<tr>
<td>2.8 Objective Functions and Decision Rules</td>
<td>57</td>
</tr>
<tr>
<td>2.9 The Course of Negotiations: Concessionary Behavior, Impasses and Settlements</td>
<td>61</td>
</tr>
<tr>
<td>2.10 Strike Measures and Strike &quot;Determinants&quot;</td>
<td>69</td>
</tr>
<tr>
<td>2.11 Conclusion</td>
<td>77</td>
</tr>
</tbody>
</table>

### Chapter 3

3. PUBLIC POLICY AND THE RESOLUTION OF INDUSTRIAL DISPUTES THROUGH STRIKE ACTION IN BRITISH COLUMBIA: 1945-75

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Changes in the General Labour Relations Laws of British Columbia: 1945-75</td>
<td>79</td>
</tr>
<tr>
<td>3.2 Strike Activity in British Columbia: 1945-75</td>
<td>88</td>
</tr>
<tr>
<td>3.3 Strike-Related Issues and Data</td>
<td>98</td>
</tr>
<tr>
<td>3.4 Wildcat Strikes in British Columbia: 1945-75</td>
<td>106</td>
</tr>
<tr>
<td>3.5 Conclusion</td>
<td>116</td>
</tr>
<tr>
<td>Chapter</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>------</td>
</tr>
<tr>
<td>4. THE EFFECTS OF CHANGES IN LABOUR LEGISLATION STRIKE ACTIVITY IN BRITISH COLUMBIA</td>
<td>118</td>
</tr>
<tr>
<td>4.1 The Regression Equations</td>
<td>120</td>
</tr>
<tr>
<td>4.2 The Data</td>
<td>129</td>
</tr>
<tr>
<td>4.3 The Time Period to be Covered in the Regressions</td>
<td>137</td>
</tr>
<tr>
<td>4.4 1945-75 Changes in British Columbia Labour Legislation and their Expected Effects on Strike Activity</td>
<td>143</td>
</tr>
<tr>
<td>4.5 Hypotheses to be Tested and Dummy Variable Configurations</td>
<td>150</td>
</tr>
<tr>
<td>4.6 General Effects of Changes in Labour Legislation on Strike Activity in British Columbia: 1950-75</td>
<td>151</td>
</tr>
<tr>
<td>4.7 Selected Effects of Changes in Labour Legislation on Strike Activity in British Columbia: 1950-75</td>
<td>163</td>
</tr>
<tr>
<td>4.8 Comments and Extensions</td>
<td>171</td>
</tr>
<tr>
<td>4.9 Conclusions</td>
<td>172</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>177</td>
</tr>
</tbody>
</table>

Appendix

A. A REVIEW OF STRIKE-AS-AN-INVESTMENT BARGAINING THEORIES | 188 |
| A.1 The Ashenfelter and Johnson Theory | 189 |
| A.2 The Eaton Theory | 191 |
| A.3 The Heiser Theory | 196 |
| A.4 The Johnston Theory | 211 |
| A.5 The Rabinovitch and Swary Theory | 224 |
| A.6 Conclusion | 228 |
### Appendix

#### B. THE 1945-75 CHANGES IN THE GENERAL LABOUR RELATIONS LAWS OF BRITISH COLUMBIA

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.1 The First Post-War Decade of Labour Legislation in British Columbia</td>
<td>231</td>
</tr>
<tr>
<td>B.2 The Labour Relations Act</td>
<td>237</td>
</tr>
<tr>
<td>B.3 The Trade-unions Act, 1959</td>
<td>239</td>
</tr>
<tr>
<td>B.4 The Amendments to the Labour Relations Act</td>
<td>240</td>
</tr>
<tr>
<td>B.5 The Mediation Commission Act</td>
<td>244</td>
</tr>
<tr>
<td>B.6 The Labour Code of British Columbia</td>
<td>248</td>
</tr>
<tr>
<td>B.7 Labour Code Amendments, Statutes Concerning Provincial Employee Bargaining and the Collective Bargaining Continuation Act</td>
<td>252</td>
</tr>
<tr>
<td>B.8 A Recapitulation of the Evolution of Labour Relations Policy in British Columbia</td>
<td>255</td>
</tr>
</tbody>
</table>

#### C. THE DATA

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.1 &quot;British Columbia Strike Data,&quot; 1945-75</td>
<td>256</td>
</tr>
<tr>
<td>C.2 &quot;British Columbia Expiry Data,&quot; 1945-75</td>
<td>257</td>
</tr>
<tr>
<td>C.3 &quot;Number of New Certifications in British Columbia,&quot; 1945-75</td>
<td>261</td>
</tr>
<tr>
<td>C.4 &quot;British Columbia Average Weekly Wages and Salaries,&quot; 1948-75, Seasonally Adjusted</td>
<td>262</td>
</tr>
<tr>
<td>C.5 &quot;British Columbia Corporate Profit Data (Before Taxes),&quot; 1950-75, Seasonally Adjusted</td>
<td>263</td>
</tr>
</tbody>
</table>
Appendix  Page

C.7 "Unemployment Rate for British Columbia,"  
1950-75, Seasonally Adjusted .......... 269-

C.8 "Vancouver Consumer Price Index,"  
1949-75  271

D. INDUSTRIES COVERED BY THE ENTIRE SAMPLE AND  
BY THE RANDOM SAMPLE OF EXPIRIES .... 272

E. CLASSIFICATIONS OF REASONS GIVEN FOR WILDCAT  
STRIKES IN BRITISH COLUMBIA: 1945-75 .... 275

F. THE STRIKE-EXPIRY RELATIONSHIP IN BRITISH  
COLUMBIA: 1945-75  279

G. TABLES OF QUARTERLY DUMMY VARIABLE SCHEMES  
FOR CHANGES IN LABOUR LEGISLATION IN  
BRITISH COLUMBIA: 1950-75 ............ 282
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number and Average Duration of Strikes Classified by Contract Status and by Jurisdiction in British Columbia: 1945-75</td>
<td>91</td>
</tr>
<tr>
<td>2</td>
<td>The Annual Pattern of Strikes in the Jurisdiction of British Columbia Classified by Key Contract Status: 1945-75</td>
<td>94</td>
</tr>
<tr>
<td>3</td>
<td>The Percentage of Strikes within the Jurisdiction of British Columbia by Industry: 1945-75.</td>
<td>97</td>
</tr>
<tr>
<td>4</td>
<td>The Legality of Strikes Classified by Contract Status within the Jurisdiction of British Columbia: 1945-75.</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>The Legality of Strikes Classified by Contract Status within the Federal Government's Jurisdictions in British Columbia: 1945-75.</td>
<td>101</td>
</tr>
<tr>
<td>6</td>
<td>Legal Measures Used to Resolve Strikes Classified by Jurisdiction in British Columbia: 1945-75.</td>
<td>103</td>
</tr>
<tr>
<td>7</td>
<td>The Modes of Dispute Resolution Employed During Strike Action Classified by Contract Status within British Columbia's Jurisdiction: 1945-75.</td>
<td>105</td>
</tr>
<tr>
<td>8</td>
<td>The Pattern of Wildcat Strikes within Selected Industries and Industrial Groupings in the Jurisdiction of British Columbia: 1960-75</td>
<td>109</td>
</tr>
<tr>
<td>9</td>
<td>Reasons for Wildcat Strikes in the Jurisdiction of British Columbia Classified by Industry: 1945-75.</td>
<td>110</td>
</tr>
<tr>
<td>10</td>
<td>Wildcat Strikes in the Federal Jurisdiction within British Columbia Classified by Industry: 1945-75.</td>
<td>113</td>
</tr>
<tr>
<td>11</td>
<td>The Interval Between Contract Expiries and Strike Commencement Dates by Contract Status in British Columbia: 1945-75</td>
<td>131</td>
</tr>
<tr>
<td>12</td>
<td>The Interval Between Contract Expiries and Strike Commencement Dates Classified by Contract Status and Industries in British Columbia: 1945-75</td>
<td>133</td>
</tr>
<tr>
<td>13</td>
<td>The Interval Between Contract Expiries and Strike Commencement Dates Classified by Contract Status in the Jurisdiction of British Columbia by Years: 1945-75</td>
<td>134</td>
</tr>
<tr>
<td>Number</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>14</td>
<td>F-Test that Estimates Using the same Regression Equation but Different Time Periods are Statistically Different</td>
<td>140</td>
</tr>
<tr>
<td>15</td>
<td>Dummy Variable Schema for Structural Shifts; All, Nearly All, Important and Fewest Important Changes in Legislation: 1950-75 Annual</td>
<td>152</td>
</tr>
<tr>
<td>17</td>
<td>Dummy Variable Schema for Learning New Rules in Two Years; Fewest Important Changes in Legislation: 1950-75 Annual</td>
<td>154</td>
</tr>
<tr>
<td>18</td>
<td>F-Test that Various Dummy Variable Configurations are Statistically Different from Zero for First Agreement Strikes: 1950-75 Annual</td>
<td>156</td>
</tr>
<tr>
<td>19</td>
<td>F-Test that Various Dummy Variable Configurations are Statistically Different from Zero for Contract Renewal Strikes: 1950-75 Annual</td>
<td>157</td>
</tr>
<tr>
<td>20</td>
<td>F-Test that Various Dummy Variable Configurations are Statistically Different from Zero for Strikes during the Term 1950-75 Annual</td>
<td>158</td>
</tr>
<tr>
<td>21</td>
<td>The Percentage Difference Between F-Statistics and Corresponding Values of the F-Distribution for Various Dummy Variable Configurations and Regressants</td>
<td>159</td>
</tr>
<tr>
<td>22</td>
<td>Selected Regression Results Involving Fewest Important Dummies: 1950-75 or 1953-75 Annual</td>
<td>164</td>
</tr>
<tr>
<td>23</td>
<td>Selected Regression Results Involving the Dummy Variables for Learning New Rules in One Year: 1950-75 Annual or 1953-75 Annual</td>
<td>165</td>
</tr>
<tr>
<td>24</td>
<td>Selected Regression Results Involving Dummy Variables for Learning New Rules in Two Years: 1950-75 or 1953-75 Annual</td>
<td>166</td>
</tr>
<tr>
<td>25</td>
<td>The Annual Number of Expiries and Contracts in Force for the Random Sample and for the Combined Sample: 1945-75</td>
<td>259</td>
</tr>
<tr>
<td>26</td>
<td>Prediction of Annual British Columbia Corporate Profits Using Both Gross and Individual Annual Personal Income for British Columbia: 1960-75</td>
<td>264</td>
</tr>
<tr>
<td>Number</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>27</td>
<td>The Best Prediction of Annual British Columbia Corporate Profits for Each Quarter, which Uses Gross Annual Personal Income for British Columbia: 1960-75</td>
<td>265</td>
</tr>
<tr>
<td>28</td>
<td>Industries Covered by the Entire Sample and by the Random Sample of Expiries</td>
<td>272</td>
</tr>
<tr>
<td>29</td>
<td>The Monthly Pattern of Expiries and of Strikes in British Columbia</td>
<td>280</td>
</tr>
<tr>
<td>30</td>
<td>Dummy Variable Schema for Structural Shifts; All Changes in Legislation; Both First Contract Strikes and Contract Renewal Strikes: 1950-75 Quarterly</td>
<td>282</td>
</tr>
<tr>
<td>31</td>
<td>Dummy Variable Schema for Structural Shifts; Important Changes and Fewest Important Changes in Legislation: 1950-75 Quarterly</td>
<td>283</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Contour Maps of Union and Firm Net-Gain Functions.</td>
<td>28</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Three-Dimensional View of Union and Firm Net-Gain Functions.</td>
<td>29</td>
</tr>
<tr>
<td>Figure 3</td>
<td>The Actual Feasible Set.</td>
<td>39</td>
</tr>
<tr>
<td>Figure 4</td>
<td>A Comparison of True Marginal p.d.f.s of Strike for the Discontinuous and Continuous Joint p.d.f.s.</td>
<td>44</td>
</tr>
<tr>
<td>Figure 5</td>
<td>True Probabilities of Settling in the Severance Region of the Feasible Set</td>
<td>49</td>
</tr>
<tr>
<td>Figure 6</td>
<td>Wage Cross-Sections of the Union and Firm Joint Subjective p.d.f.s.</td>
<td>51</td>
</tr>
<tr>
<td>Figure 7</td>
<td>Strike Cross-Sections of the Union and Firm Joint Subjective p.d.f.s</td>
<td>54</td>
</tr>
<tr>
<td>Figure 8</td>
<td>The Three Dimensional Space, $S \times W \times Z$ as it Applies to the Union and Firm in Johnston's Theory and in the Theory of This Dissertation.</td>
<td>218</td>
</tr>
<tr>
<td>Figure 9</td>
<td>The Employer's Subjective Estimate of the Strike Probability Associated with a Given Wage Offer and its Relationship with the Bilateral Framework in Heiser's Theory</td>
<td>221</td>
</tr>
</tbody>
</table>
NOMENCLATURE

OF REGRESSORS AND REGRESSANTS

Regressors

**PROF**  
Annual British Columbia Corporate Profits Before Taxes

**PROF**
Annual British Columbia Corporate Profits Before Taxes, Quarter 1

**PROF**
Annual British Columbia Corporate Profits Before Taxes, Quarter 2

**PROF**
Annual British Columbia Corporate Profits Before Taxes, Quarter 3

**PROF**
Annual British Columbia Corporate Profits Before Taxes, Quarter 4

**LN()**  
Natural logarithm of the variable in parenthesis

Regressors

**I**  
Intercept

**IPI**  
British Columbia Individual Personal Income

**GPI**  
British Columbia Gross Personal Income

**LN()**  
Natural logarithm of the variable in parenthesis
## NOMENCLATURE

### OF REGRESSORS AND REGRESSANTS

**Regressants**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS$_1$</td>
<td>Number of first agreement strikes</td>
</tr>
<tr>
<td>NS$_2$</td>
<td>Number of contract renewal strikes</td>
</tr>
<tr>
<td>NS$_3$</td>
<td>Number of strikes during the term</td>
</tr>
<tr>
<td>C</td>
<td>Number of new certifications</td>
</tr>
<tr>
<td>X</td>
<td>Number of expiries</td>
</tr>
<tr>
<td>F</td>
<td>Number of contracts in force</td>
</tr>
<tr>
<td>NS$_1$/C</td>
<td>Ratio of NS$_1$ to C</td>
</tr>
<tr>
<td>NS$_2$/X</td>
<td>Ratio of NS$_2$ to X</td>
</tr>
<tr>
<td>NS$_3$/F</td>
<td>Ratio of NS$_3$ to F</td>
</tr>
</tbody>
</table>

**Regressors**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Average age of the employed non-agricultural work force</td>
</tr>
<tr>
<td>P</td>
<td>British Columbia Before-Tax Profits</td>
</tr>
<tr>
<td>U</td>
<td>Unemployment Rate</td>
</tr>
<tr>
<td>ΔCPI/CPI</td>
<td>Change in the consumer price index*</td>
</tr>
<tr>
<td>$</td>
<td>ΔW_t/ΔW_{t-1}</td>
</tr>
</tbody>
</table>

*Same quarter for quarterly data*
I wish to acknowledge those people, without whose assistance and support, I would not have completed my thesis. My thesis supervisor, Stuart Jamieson, without whose tutelage I would not have been able to undertake this study, provided useful insights and greatly assisted me in understanding labour relations in British Columbia. I wish to acknowledge the other members of my Ph.D. committee: John Cragg, who made incisive suggestions, who was very supportive and who assisted me to the end, and Russell Uhler, who provided useful comments. Curt Eaton inspired me to undertake this study and provided thoughtful encouragement. Marty Puterman supplied invaluable assistance in helping me with the exposition of my theory, in showing me how to edit files on the computer and generally in supporting me in my endeavour. Mrs. Maryse Ellis, who typed much of my dissertation, deserves an extra special thank you not only for the outstanding job of typing she did but also for her very kind friendship and support. I deeply appreciate the work of the other typists who assisted me: Audrey Milligan, Laurel McLachlin and Ellen Moore.

Many people deserve acknowledgement for the behind-the-scenes support they provided. They include my wife's parents, the T.K. Nakagawas, Bobby Nakagawa and Cathy Elliott. Larry Blain and Linda Nutter deserve an extra special thank-you, for I doubt that I would have finished, had they not twice extended their warm hospitality to me while I gathered data in Ottawa.

I wish to acknowledge the University of British Columbia and the University of Alberta, both of whose resources, faculty and staff made immense contributions to my thesis. In addition, I wish to express
my sincerest appreciation to the Canada Council and to Labour Canada, who provided partial funding for my research project as well as considerable assistance.
DEDICATED TO:

My Mother (the "Wyoming cowgirl")

My Dad and Ellengene

Judy, and Suzanne
INTRODUCTION

Changes in governments, mounting public criticism about strike waves, poor drafting of labour statutes, and reforms proposed by experts in labour relations often have led to revised, revamped or newly drafted general labour relations laws in Canada. Some of these changes were intended to minimize the probability that industrial unrest or interest disputes will develop into strikes and lockouts, and certain changes in legislation presumably exerted unanticipated effects on the incidence of work stoppages in Canada. Unfortunately, relatively little is known about the relationships between changes in labour legislation and strikes and lockouts in Canada.

A few labour economists, most notably Vanderkamp (1970), Smith (1972) and Walsh (1975), have investigated empirically strike activity in Canada. But the scope of their studies was national and this precluded them from directly accounting for changes in labour legislation, for the Canadian legal framework of labour relations generally has been "balkanized"—particularly since World War II ended. Provincial legislation, for example, has regulated over ninety percent of the industrial disputes that occurred in Canada during the years since at least 1950, while
federal legislation has covered the remainder. General labour relations laws have differed markedly from one jurisdiction to another. The relationship between changes in labour legislation and work stoppages in Canada, therefore, should be explored on a jurisdictional basis, rather than on a national basis.

This dissertation is conceived of as a pilot study of the relationship between changes in labour legislation and the incidence of strikes and lockouts in Canada during the three decades since the end of World War II. The 1945-75 period is of interest, because the Wartime Labour Relations Regulations or P.C. 1003, the Canadian equivalent to the Wagner Act of the United States, was enacted in 1944 and has set the basic pattern and tone for Canadian general labour relations laws and amendments of those laws since 1944. This study will focus exclusively on one jurisdiction, British Columbia, during the 1945-75 period and, as such, it stands on its own. It is a pilot study in the sense that it should generate theoretical insights, research methods and tentative conclusions or hypotheses which can be applied and tested in other jurisdictions across Canada.

British Columbia was selected, in part, because it is one of three labour relations jurisdictions in Canada which typically

\[1\] See Jamieson (1973), particularly Chapter 5, and Woods (1973), especially Chapters I, II, III, and V.
have also been treated as regional economies.² Since regional economies exist in Canada and labour statues vary from jurisdiction to jurisdiction, relatively little nation-wide collective bargaining transpires outside the federal jurisdiction. The regional economy where negotiations take place generally constitutes the frame of reference for negotiating the various terms of collective agreements or resolving them through third party intervention.³ For these reasons I intend to use regional economic determinants to study strikes and lockouts in British Columbia.⁴

British Columbia has rich labour history and experienced certain novel legislative experiments from 1945 through 1975.⁵ Especially noteworthy were the Trade-unions Act of 1959, the Mediation Commission Act of 1968 and the Labour Code of British Columbia, which was enacted in 1973. The Trade-unions Act was designed to reduce the incidence of wildcat strikes by confronting trade-unions with liability for damages ensuing from wildcat strikes. The Mediation Commission Act established a permanent tribunal responsible for appointing mediation officers and capable of functioning like a conciliation board following mediation. This

²See Brewis (1965), especially Chapter 13, Ostry and Zaidi (1972), Peitchinis (1975), and Blain (1977).

³See Downie (1971) and H.D. Woods, et al. (1968), pp. 60-64.

⁴The criticism that national studies were not disaggregated to study patterns of work stoppages in relationship to regional economic determinants of strike and lockout activity applies to Ashenfelter and Johnson's (1969) study in the United States, as well as to those in Canada by Vanderkamp (1970), Smith (1972) and Walsh (1975).
Act was highly controversial since it permitted the cabinet to compel the parties of an industrial dispute to submit to binding arbitration by the Mediation Commission, provided the cabinet deemed that the dispute threatened the public interest or welfare. Such arbitration was compulsory, regardless of whether the particular dispute took place in the private sector or the public sector. The Labour Code, by contrast, implemented a number of proposals that the Prime Minister's Task Force on Labour Relations had suggested in 1968. Although it resembled the Ontario Labour Relations Act of 1970, the Code contained its own distinctive features. For instance, the Labour Code, as it was initially drafted and passed, conferred the *de jure* right to strike on employees in what it termed the essential services: police, firemen and hospital workers.

The 1945-75 period in British Columbia progresses from the Federal government's regulating labour relations in B.C. (1945-47) to the Labour Code's regulating labour relations in B.C. (1973-75). This period embraces provincial labour legislation which was drafted and enacted by three different governments: the Coalition Government (Liberal-Conservative: 1947-50), the Social Credit Government (1950-72) and the New Democratic Government (1972-75).

---

This study will look at two kinds of strikes. For one, it will examine "wildcat strikes" or strikes which typically arise from rights disputes, which occur during the terms of collective agreements and which, therefore, generally are conducted illegally. For another, it will examine strikes and lockouts which are associated with contract negotiations; they constitute interest disputes and generally are conducted legally. I concur with other researchers—particularly Rees (1952) and Eaton (1973)—and consider that these two types of work stoppages differ in kind and, accordingly, in the economic determinants that explain them. Hence, a theoretical model will be developed for each of these two kinds of work stoppages and applied empirically. Each model suggests a set of economic determinants of strike activity. We shall attempt (1) to "normalize" strike measures by regressing them against economic determinants and, therefore, (2) to isolate the effects of changes in labour legislation on the incidence of strikes and lockouts in British Columbia from 1945 through 1875. Dummy variables will be used to represent changes in labour legislation in the regression analysis of this study.

6 All Canadian jurisdictions, except for Saskatchewan, proscribe strikes or lockouts during the terms of collective agreements.

7 Rights disputes centre on the terms of collective agreements, since labour and management have legally resolved their interests by ratifying a contract. Interest disputes occur when the interests of labour and management are to be resolved. This clearly occurs during contract negotiations but may occur during the term of a contract when a matter is at issue which the collective agreement does not cover. Familiar examples of the latter include disputes over technological change or contracting out.
This study will be organized as follows. Chapter 1 consists of a review of the empirical literature concerning strike activity and labour legislation. Chapter 1 contains an explanation of the contributions that this study will make to both of those bodies of literature.

Chapter 2 consists of a presentation of the bargaining theory that will be used to generate the economic determinants that will be used in regression analysis of strikes that issue from interest disputes. The bargaining theory is a strike-as-an-investment theory of bargaining under uncertainty.

The focus of Chapter 3 is on public policy and the resolution of industrial disputes through strike action in British Columbia from 1945 through 1975. It focusses on (1) the differences among strikes classified by contract status, (2) the legality of strike activity, (3) the extent to which governments of British Columbia intervened to end strikes, and (4) the nature of wildcat strikes and possible explanations of wildcat strikes. Chapter 3 includes a presentation of the theory of strikes during the term that will be used in our empirical study of strikes during the term in British Columbia.

The empirical results of the current study are presented in Chapter 4. In other words, Chapter 4 focusses on the effects of changes in labour legislation on strike activity in British Columbia from 1945 through 1975.
CHAPTER 1
A REVIEW OF THE EMPIRICAL LITERATURE CONCERNING STRIKE ACTIVITY AND LABOUR LEGISLATION

This chapter reviews the empirical literature that pertains to this study. Our empirical work will draw upon and tie together elements from at least five strands of the literature that deals with strikes and/or labour legislation. The five strands focus on the following topics:

(i) the use of economic determinants in regression analysis to analyze the impact of changes in labour legislation on the incidence of strike activity;

(ii) regional patterns and regional determinants of strike activity in Canada;

(iii) measures of the incidence of strikes with a particular focus on the relationship between the "strike cycle" and the "contract expiry circle";

(iv) patterns of strike activity where strikes have been disaggregated according to contract status;¹ and

¹Contract status refers to strikes that occur during the negotiation of a first agreement, during the renegotiation or renewal of a previously existing agreement or during the term of an agreement. The latter also are termed "wildcat" or "illegal" strikes, but the term, "illegal" strike, is something of a misnomer, since labour laws may be contravened during strikes which involve either the negotiation of a first agreement or the renegotiation of a previously existing agreement.
(v) the relative impact of voluntary versus compulsory modes of dispute resolution upon strike activity.

We shall deal with these topics in their order of presentation above.

The review of the literature will reveal that none of the previous research projects drew upon or combined elements from the five strands of literature to analyze the relationship between changes in labour legislation and strike activity.

1.1 Studies Using Regression Analysis

The one study that explicitly used regression analysis to assess the impact of a change in labour legislation upon the incidence of strike activity was by Ashenfelter and Johnson (1969) [denoted A-J herein after]. A-J applied regression analysis to national data on strikes in the United States during the period from 1952 through 1967. A-J used the customary set of economic determinants of strikes: an indicator of the profitability of the firm (profits in the case of A-J), the unemployment rate, a price index, and a wage variable. The hypothesis that A-J tested, and failed to reject, was that the enactment of the Landrum-Griffith Act, which promoted union democracy, had led to an increase in the incidence of strike activity, measured as the number of strikes, since its enactment in 1959. An intercept dummy variable
represented the change in legislation in the regression analysis. A-J did not concern themselves with the debate about voluntary versus compulsory forms of dispute resolution because the national labour policy of the United States traditionally has been rooted on, and promoted, voluntarism.

The A-J study had at least three shortcomings. First, the strike data were not classified according to contract status. Because strikes which are classified by contract status occur under different circumstances, they are in effect different kinds of strikes and the economic determinants of these strikes differ. Second, Ashenfelter and Johnson did not collect data concerning contract expirations or expiries. They simulated the effect of expiry data through the use of dummy variables. Third, because the A-J study was national in scope, it glossed over the regional bargaining patterns in the United States and, therefore, omitted regional determinants of strike activity.

Using Canadian data covering the period of time from 1901 through 1966, Vanderkamp (1970) conducted an empirical investigation of strike activity on a national basis. Although Vanderkamp discussed the influence of labour legislation on the incidence of strike activity, he did not explicitly test for the effect of labour legislation. Other recent studies of strike activity in Canada, such as those by Smith (1972), Walsh (1972) and Swidinski (1976), likewise, were national in application and failed to test the hypothesis concerning the labour legislation-strike relationship.
1.2 Studies of Regional Patterns and Regional Determinants of Strike Activity

Perhaps, the most cogent argument in favour of focussing on the regional patterns and on the regional economic determinants of strikes was put forward by Jamieson, who argued, among other things, that "...there are such pronounced regional divisions and differences as to make...'national patterns' almost meaningless."\(^2\) Several researchers, including Jamieson (1977b), Eaton (1973) and Garner (1977), have concluded that the patterns of strike activity have varied widely across Canada's regions and/or provinces, regardless of the measure of strike activity (duration, working days lost per employee or man days lost). Two of the reasons researchers cite very often in arriving at this conclusion are that the industrial mix varies from region to region and, to a lesser extent, from province to province, and that the performances of regional economies vary markedly across Canada.

1.3 Studies Using Measures of the Incidence of Strikes and the Strike-Expiry

Various researchers, including Skeels (1971), Eaton (1973), Walsh (1975), and Kelly (1976), have examined and weighed the use-

\(^2\)See Jamieson (1968, 42). See also Jamieson (1962, 405) where he compares the 1949-59 strike experience in British Columbia with the corresponding experience in the rest of Canada.
fulness of activity measures, as opposed to incidence measures of strikes. The former are absolute measures during a given time period: number of strikes, number of workers involved in strikes and man-days lost during strikes. The latter also are measured over a stipulated period of time, but they are proportionate measures: (1) number of strikes relative to the number of expiries; (2) the number of workers involved in strikes relative to the number of workers whose collective agreements expired; and (3) the man-days lost due to strike activity relative to the estimated working time if no strikes took place during the stipulated period of time. Kelly calls (1) "incidence," (2) "weighted incidence" and (3) "composite incidence," since (3) involved incidence, weighted incidence and average duration. The general consensus is that incidence measures are better-suited to empirical analysis than activity measures, since incidence measures are viewed as empirical estimates of the probability that a certain number of strikes will issue from a given number of expiries. Moreover, in the level of bargaining activity, they provide truer indications of the propensity to strike than do activity measures.

Kelly is the only member of the researchers listed above who has actually gathered contract expiry data and analyzed the relationship between contract expirations and strike activity. Kelly's study covered strikes and expiries in Ontario from 1968 through 1975. His analysis was confined (a) to determining...
the elasticity of strikes with respect to expiries for seasonally adjusted strike and expiry series, (b) to examining inter-industry differences in the measures of strike activity and incidence and (c) to assessing the relative usefulness of activity versus incidence measures. Significantly, Kelly did not regress incidence measures against economic determinants of strikes. To the best of my knowledge, the present study is the first study where the regressants include the incidence (1) measure—the ratio of contract renewal strikes to "open agreements"—and where the regressors include economic determinants like the economic determinants in the A-J study.3

One of several important contributions that Kelly made to the literature on the strike-expiry relationship was that he proposed constructing an incidence measure for strikes during the term of collective agreements. Kelly's proposed incidence measure was the ratio of unauthorized strikes to contracts in force. That measure will be used in this study. Moreover, we shall propose, and use an analogous incidence measure for first agreement strikes: the ratio of first agreement strikes to new certificates.

3For our purposes, a collective agreement will be deemed "open," if the specified expiration date has been surpassed. Otherwise, it will be considered "closed." Thus, even if a continuation clause has taken effect, the contract will be termed "open." Relatively few contracts contain continuation clauses, so that only rarely are strikes which occur after contracts have come open, strictly speaking, strikes during the term.
Clack (1975) studied "wildcat" strike activity in Canada's eleven jurisdictions and the United States during 1946-72. He found similar wildcat strike experiences in both countries. Indeed, wildcat strikes made up roughly thirty percent of all strikes in both countries. British Columbia traditionally had an incidence of wildcut strikes in excess of thirty percent, but it is not the most wildcat-prone province. Nova Scotia is. Clack also investigated the reasons employees stated for wildcatting and found that wage issues frequently were cited. This study will focus on 1945-75 wildcat strike activity in British Columbia and examine the reasons given for strikes during the term.

1.4 Studies Where Strike Data Were Disaggregated by Contract Status

At least three Canadian researchers previously disaggregated strike statistics by contract status. The Carrothers-Palmer (1966) study of the labour injunction in Ontario classified Ontario strike data into four categories of contract status: (1) first agreement strikes, (2) contract renewal strikes, (3) strikes during the term, and (4) other strikes.4 Mr. Justice

4 Carrothers and Palmer labelled their categories as (1) during negotiation of first agreement or union recognition, (2) during renegotiation of agreement (3) during term of agreement, and (4) in other circumstances. The latter category included "instances where there was no collective agreement prior to the work stoppage and the conclusion of a formal agreement was not a basic issue." See Carrothers and Palmer, 1966, Table 40, 234 n.
Rand's (1968) inquiry into labour disputes in Ontario, differentiated between strikes during the term and strikes that issue from interest disputes, but his main concern was the legality or illegality of strikes. Jamieson (1971) also distinguished between strikes during the term and strikes that issue from interest disputes, but he only focussed on strike activity within the forest products industries of British Columbia from 1949 through 1969. Significantly, none of the three researchers used his disaggregated strike data in regression analysis. Thus, our study seems to be at least the first Canadian study (if not the first North American study) to use strike data classified by contract status in regression analysis.

1.5 Studies of the Relative Impact of Voluntary Versus Compulsory Modes of Dispute Resolution

It seems that the key field studies of compulsion versus voluntarism have concerned the so-called essential services. Probably, the most important studies were the study by Arthurs (1968) in Canada and Cullen's (1968) study of national emergency strikes in the United States. Arthurs argues in favour of the

---


6 See Jamieson, 1971, Table I, 151.
American "arsenal of weapons" concept where such weapons as *ad hoc* legislation are to be used as ultimate threats to induce labour and management to agree. Cullen found that a very small proportion of so-called national emergency disputes, mainly in the coal industry, indeed constituted a national economic emergency. Though extremely interesting, neither study "normalized" strike measures with economic determinants nor used regression analysis. By contrast, the current study will attempt to combine both techniques.

Cunningham (1970) investigated the efficacy of compulsory two-stage conciliation procedures when they were being de-emphasized in Nova Scotia, New Brunswick and Ontario. He found that "the benefits to collective bargaining have been desirable, and that the incidence and/or magnitude of strikes have not increased (1970, 62)." The importance of Cunningham's study and findings are that they came at a time when the "great Canadian preoccupation" with compulsory third-party intervention was fading. Canadian governments had stipulated that dispute resolution procedures be mandatory preconditions to lawful interest dispute strikes since as early as the turn of the Twentieth Century. It was during mid-1950s that the Government of British Columbia began to de-

---

7 In two-stage conciliation, the first stage involves a conciliation officer who attempts to mediate a settlement, while the second-stage is composed of a tripartite conciliation board which will propose a non-binding settlement following fact-finding hearings with labour and management. It is tripartite because there is one labour representative, one management representative and a chairman whom they select or who is appointed should they fail to agree.
emphasize compulsory two-stage conciliation procedures, which had been mandatory in British Columbia since the end of World War II. Like the studies by Arthurs and Cullen, the study by Cunningham was largely descriptive-analytical and it did not use regression analysis.

1.6 Conclusion

It is hoped that this dissertation will make several contributions to the literature on strike activity and labour legislation. Key contributions should include the classification of strike data by status; the use of expiry data to form a measure of the incidence of strike activity in British Columbia; the use of regional, rather than national economic determinants to study strike activity; and the use of dummy variables in a regression analysis to study the impact of changes in labour legislation on the incidence of strike activity in British Columbia and, in fact, in Canada. Because the legislative changes that will be studied incorporated the post-World War II shift in British Columbia and the rest of Canada from compulsory to voluntary forms of third party intervention into interest disputes, I should be able to at least indirectly assess the practical consequences of the voluntarism versus compulsion.
Study of these matters requires a bargaining theory which yields the economic determinants of strike activity. Our strike-as-an-investment theory of bargaining under uncertainty will be presented in the next chapter.
CHAPTER 2

A STRIKE AS AN INVESTMENT THEORY OF
BARGAINING UNDER UNCERTAINTY

The strike is said to be the "great softening device" of collective bargaining. It imposes costs on both labour and management, and the imposition of these costs, or the threat thereof, should cause labour and management to make wage concessions.\(^1\) In other words, the strike presumably "softens" the (wage offer) positions of labour and management. The firm or union in a strike-as-an-investment theory of bargaining treats the strike as a means for inducing a wage settlement, the benefits of which will equal, if not exceed, the costs it incurs through strike action. Analogously, it considers the strike threat a means for generating wage concessions.

Strike-as-an-investment bargaining theories date at least to 1932 when Hicks formulated his seminal theory of labour negotiations.\(^2\) A proliferation of such theories occurred during the past

---

\(^1\) See, for example, Dunlop (1967). The term, "strike" is used generically here to include both union-initiated work stoppages (strictly speaking, strikes) and employer-initiated work stoppages (lockouts).

\(^2\) Some students of industrial relations argue that what we have termed a "bargaining theory" is in fact only a theory of negotiations. In their view, a bargaining theory is more embracing and includes, for instance, contract administration and the history of unionization. See, for example, Hameed (1969) and Tripp (1963).
decade. Probably the most realistic strike-as-an-investment models of labour negotiations are those of Johnston (1972a) and Rabinovitch and Swary (1976), since Johnston and Rabinovitch and Swary modelled collective bargaining under uncertainty and since their theories were two-sided. "Two-sidedness" means that both labour and management not only consider but also actually may invoke the strike weapon and that both labour and management pursue gain-maximizing strategies at the bargaining table.

There are three basic and interrelated goals which our theory strives to satisfy. (1) It tries to portray collective bargaining more realistically than existing theories, especially by predicting that strikes actually might occur. (2) It attempts to incorporate the legislative framework that governs collective bargaining. (3) It is intended to generate the economic determinants of strike activity to be used in the empirical analysis of the relationship between changes in labour legislation and strike activity in British Columbia from 1945 through 1975.

2.1 The Basic Framework

The basic framework of analysis is the bilateral monopoly framework. The economy is divided into two sectors: a unionized sector whose firms engage in imperfect competition and a lower-wage non-unionized sector whose firms engage in pure competition.4 Wage


4 In "pure competition" firms are price-takers but decision makers do not possess perfect information, as they would in "perfect competition."
dispersion exists in the organized sector; it occurs because of differences in union bargaining power vis-a-vis employers and obversely and because collective agreements expire on different dates. It is assumed that firms in the competitive sector are "in equilibrium," earning a "normal rate of return" but that the imperfectly competitive firms earn supernormal rates of return on their capital. In other words, the unionized firm, a monopolist or oligopolist, earns "economic rents." (The latter term is used loosely here.)

The organized firm and its union can engage in collective bargaining because they are better off where they are than elsewhere in the economy. The firm is reluctant to migrate within the economy, since it would earn a lower rate of return in the purely competitive sector and since rents would be capitalized into the sale price of a firm in the imperfectly competitive sector, reducing the return

See, for example, Dunlop (1948) in Rowan, (1976, 70) concerning market structure and unionization. Archibald and North (1972), for instance, have analysed unionization within purely competitive industries in particular. Their analysis focuses on firms' marginal cost curves, since by definition firms are price-takers in purely competitive industries. Everything else the same, non-unionized firms enjoy lower marginal costs than unionized firms in the industry, if the union wage rate exceeds the non-union wage rate. Significantly, the existence of this cost differential creates an incentive not only for unions, but also for employers to seek to organize the non-union plants in the industry. Moreover, non-unionized firms will attempt to enter the industry to capture the infra-marginal profits that result from the union/non-union wage differential. Unionized firms clearly will attempt to repel non-unionized firms from entering the industry and from realizing such infra-marginal profits.

Economic rents are, of course, returns that accrue due to demand or supply rigidities. They accrue, for instance, to factors of production that are fixed or "quasi-fixed." (See, for example, Lipsey (1970) and Oi (1962).)
that the firm would derive from such a purchase.\textsuperscript{7} The union members clearly are reluctant to migrate to the lower-wage non-union labour sector. Assuming that information is imperfect, the organized firm's employees presumably perceive that they would receive a lower lifetime income stream if they decided to quit the firm, become unemployed and search for employment in the unionized sector. The differential in rates of return and wages in the two sectors means that the firm's reservation wage (the wage rate at which it would leave the industry) exceeds the union's reservation wage (the wage rate at which employees would leave the firm), thereby making wage negotiations possible. It also means that the organized firm and its employees can incur some of the costs of strike action in an attempt at inducing concessionary wage behaviour at the bargaining table.

Both labour and management are gain-maximizers. The union in particular attempts to usurp as much as it can of firm's rents through collective bargaining. Operating under uncertainty, the firm, in turn, "buries its rents," in order to make the firm's "ability to pay" seem less attractive to the union—as well as to deter competitors from entering the industry and for tax purposes.

Labour and management negotiate under uncertainty. During negotiations they are uncertain as to (1) the final wage settlement since the latter requires mutual consent, and (2) whether or not a strike will occur or, if one is taking place, how long it will continue.

\textsuperscript{7}See, for example, Smith (1971, 27-28).
The ("control") variables through which labour and management seek to influence the final wage settlement are, of course, the wage offers they make and the decision whether or not to strike. Uncertainty causes labour and management to consider the set of possible outcomes to negotiations and to attach probabilities to them, as explained below.

Decision-makers are assumed to be risk-neutral. Being risk-neutral, decision-makers seek to maximize expected gains. The decision rules that they use, consequently, involve expected gains. Following Johnston (1972a, 848), it is assumed that decision-makers know the nature but not necessarily the form (i.e., the parameters) of their adversaries' decision-framework.

General labour relations laws regulate the collective bargaining process. Labour statutes set out certification and decertification processes whereby unions or employers' associations can attain legal sanctioning to bargain collectively as exclusive bargaining agents on behalf of appropriate bargaining units. They also provide for third-party intervention into negotiations and stipulate that labour and management have a "duty to bargain" and, moreover, a "duty to bargain in 'good faith.'" Two deadline procedures in these acts apply to collective bargaining. One requires the commencement of negotiations by a stipulated date; the other is the deadline for lawful strike action, which these statutes sanction. These statutes regulate strike action, typically permitting strikers to resume employment after the strike has ended. Moreover, they stipulate that new purchasers of existing, operating firms (so-called successors) are obliged to
honour previously existing bargaining relationships and collective agreements. (That is, these laws stipulate "successor rights and obligations.") General labour relations laws, therefore, reinforce the symbiotic relationship between labour and capital, making it difficult (but by no means impossible) for either labour or management to sever their bargaining relationship.  

"Ruination" constrains the bargainers. "Ruination" occurs whenever the collective bargaining relationship between labour and management is permanently severed—that is, whenever the firm shuts down, seeking to migrate, or whenever the union migrates or loses its members (i.e., is broken).

2.2 The Firm

The firm's gain function, its net worth function, will be defined as follows:

\[
NW(s,w) = \int_s^\infty (pQ - wL - H)e^{-rt}dt - \int_0^S He^{-rt}dt - FC_f - F(s) + SI - RP
\]

---

8 The term and notion of ruination in bargaining theories dates at least to the 1930s. See Hicks (1966) and Zeuthen (1968), both of which originally were published in the 1930s.

8a Another factor which will tend to cement the symbiotic relationship between labourer and capital is firm-specific human capital. Union members who possess firm-specific human capital generally will seek to remain employed by the firm in the event of a strike. Furthermore, they will attempt through collective bargaining to capture some, if not all, of the rents that stem from the human capital they embody. The firm obviously would prefer to retain those employees who possess firm-specific human capital, rather than incur the costs of training employees who lack it. (See, for example, Walton and McKersie, 1965, 21-23.)
where
\[ FC_f = \int_{s}^{\infty} ae^{-rt} dt; \quad a > 0 \text{ and } a' = 0 \]
\[ F(s) = \int_{0}^{s} be^{-rt} dt; \quad b \geq 0 \text{ and } b' = 0 \]
\[ SI = \int_{0}^{s} ce^{-rt} dt; \quad c \geq 0, \quad c' = 0 \text{ but } SI = cs_0 \]
for \( s > s_0 \) where \( s_0 > 0 \) and \( s'_0 = 0 \)
\[ RP = v; \quad v \geq 0 \text{ and } v' = 0 \]

The two integral terms derive from Ashenfelter and Johnson. The left-hand integral represents the firm's future profit stream, discounted at rate \( r \) and calculated from the date the strike ended, \( s \). In the expression for profits, \((pQ - wL - H)\), \( p, Q, w, L, \) and \( H \) respectively stand for price, quantity, wage rate, labour services and the opportunity costs of the firm's capital.\(^9\) The right-hand integral represents the capital costs that the firm will incur until the strike ends. The uncovered fixed costs are \( a \) priori fixed costs and do not include \( a \) posteriori fixed costs, since "by-gones are by-gones."\(^10\) The difference between the two integrals simply means that the firm will forego profits during the strike and that it will incur fixed costs during the strike. Following Ashenfelter and Johnson (1969, 37-39), we shall abstract from technological change and ignore the wage-employment trade-off.\(^11\)

\(^9\) Thus, whenever the expression,
\[ \int_{0}^{\infty} (pQ - wL - H) e^{-rt} dt \]
takes on a zero value, the firm is covering its capital costs (i.e., earning a normal rate of return).

\(^10\) See, for example, Hicks, 1966, 145.

\(^11\) However, the wage-employment trade-off could be appended to the current theory by following Heiser, as explained below.
The term, $F_C$, represents the fixed costs ($FC$) to the firm ($f$) of strike activity. These fixed costs are modelled as a positive constant, $a$, which is discounted at the rate $r$. $FC_f$ is included in equation (1) to add realism to the current bargaining theory. In particular, $FC_f$ creates a disincentive for the firm to attempt to engage in strikes of very short duration. $FC_f$ clearly has a greater impact on NW $(s,w)$ for short strikes as opposed to long strikes, everything else the same.

There are both theoretical and empirical reasons for expecting that once a contract negotiations strike takes place, it will last for a minimum of, say, several days. The theoretical reason is that the side against whom strike (or lockout) action is taken presumably will prolong the strike, thereby imposing greater costs on the adversary, (1) in order to punish the adversary and (2) in an attempt at generating concessionary behaviour at the bargaining table. That is, a few days' strike probably will not generate much in the way of concessionary behaviour. The empirical reason is that the average duration of first agreement strikes and contract renewal strikes was several weeks in British Columbia during 1945-75. (See Table 1 below.)

$F(s)$ is a Heiserian supplementary function (1970, 65). It models the financial stringency and the loss of "good will" (e.g., the loss of market shares) that the employer may experience during a strike. "Financial stringency" means that the firm lacks sufficient receipts to cover expenditures during the strike. A constant, $b$, is used, for the sake of convenience, to model financial stringency and the loss of "good will."
SI and RP come from Eaton's model. Strike insurance, SI, increases the firm's net worth and makes it easier for the firm to withstand a strike while retroactive payments, RP, clearly decrease the firm's net worth. SI typically is paid at a constant rate during a strike and is so modelled above. The variable, \(s_0\), measures the length of time, at the end of which strike insurance is no longer paid. For the sake of simplicity and following Eaton (1972, 676), RP will be treated as a lump-sum payment and, therefore, be constant in value.

The properties of the firm's net worth function probably can be best understood by constructing "iso-net worth functions" in the first quadrant of the strike-wage plan. Integration and simplification of equation (1) yields:

\[
NW(s,w) = \left(\frac{1}{r}\right) (pQ - wL + b - c)e^{-rs} - \left(\frac{1}{r}\right) (H + a + B - C) - v
\]

\(\ldots \ldots (2)\)

Let us take the total differential of equation (2) and set it equal to zero. The result is

\[
dNW = \left(\frac{\partial NW}{\partial s}\right) ds + \left(\frac{\partial NW}{\partial w}\right) dw = 0
\]

\(\ldots \ldots (3)\)

where

\[
\left(\frac{\partial NW}{\partial s}\right) = -(pQ - wL + b - c)e^{-rs}
\]

\(\ldots \ldots (4)\)

and where

\[
\left(\frac{\partial NW}{\partial w}\right) = -(1/r) L e^{-rs}
\]

\(\ldots \ldots (5)\)

The slope of the iso-net worth function is

\[
\left.\frac{dw}{ds}\right|_{dNW=0} = - \left(\frac{\partial NW/\partial s}{\partial NW/\partial w}\right)
\]

\[
= -(r/L) \left[ (pQ - wL) + (b - c) \right]
\]

\(\ldots \ldots (6)\)
It is generally expected that equation (6) will be negative. It clearly is negative whenever the term in brackets is positive. Economic realism requires that \((pQ-wL)\) be positive. If no strike insurance were paid (i.e., \(c = 0\)), as often is the case, the slope of the NW function unambiguously will be negative. Only if the absolute value of \(c\) exceeds the absolute value of \((pQ - wL + b)\) will NW have a positive slope. But, the likelihood that this will occur is exceedingly small, since strike insurance payments \((c)\) must exceed foregone profits, \((pQ - wL)\), plus the losses due to financial stringency and to the loss of "good will" \((b)\).

The second derivative of the iso-net worth function is

\[
\frac{d^2w}{ds^2} \bigg|_{dNW = 0} = 0 + r \frac{dw}{ds} \bigg|_{dNW = 0} \ldots (7)
\]

Thus, each iso-NW function generally will be a negatively sloped curve which is concave to the origin.

Figure 1 depicts a contour map of the net worth function in the typical case (where it has a negative slope). Figure 2 depicts the net worth function in three dimensions.

The constraint of ruination is depicted in Figures 1 and 2 by the "ruination curve," \(NW_{0c}\). \(NW_{0c}\) is the firm's long run shut down curve, the curve at which the firm just fails to cover its opportunity costs. \(NW_{0c}\) will be defined as

\[
NW_{0c}(s,w) = \int_{0}^{\infty} (pQ - wL -H)e^{-rt}dt = 0
\]

The properties of the NW function that were presented heretofore apply to pre-strike negotiations. The net worth function that applies to post-strike negotiations will differ from its pre-strike counterpart in two seemingly small but, nonetheless, significant ways.
Figure 1  Contour Maps of Union and Firm Net-Gain Functions
Figure 2 Three-Dimensional View of Union and Firm Net-Gain Functions

Legend: 
- \( w \) = wage offer (or potential settlement)
- \( s \) = duration of work stoppage
- \( \text{NEB} \) = net economic benefits
- \( \text{NEB}_{0c} \) = union's ruination curve
- \( \text{NW} \) = net worth
- \( \text{NW}_{0c} \) = firm's ruination curve
Let us assume that the strike duration to date is $s$.

One difference is that the post-strike supplementary function, $F(s)$, will be

$$F(s) = \int_0^s be^{-rt} dt + \int_0^\tilde{s} be^{-rt} dt; \ b \geq 0 \ \text{and} \ b' = 0,$$

as opposed to $F(s) = \int_0^s be^{-rt} dt$ for pre-strike negotiations. Forms of financial stress—such as lost market shares, loans that were taken out during the strike and the interest on those loans—are not by-gones. Instead, they cumulate over time and they constitute real economic costs. The real costs that accumulate during a strike are represented by $\int_0^\tilde{s} be^{-rt} dt$ in the post-strike formulation of $F(s)$. It should be noted that the zero in the post-strike supplementary function represents the current point in time; whereas, it represents the date on which the strike will commence in the pre-strike supplementary function.

The other difference is that post-strike insurance payments, $SI$, will be

$$SI = \int_0^{(s-\tilde{s})} ce^{-rt} dt; \ c > 0 \ \text{and} \ c' = 0$$

for $s < s_o - \tilde{s}$

and

$$SI = 0 \ \text{for} \ s > s_o - \tilde{s}.$$  

What distinguishes this $SI$ from pre-strike $SI$ is that strike payments will cease after a time period of $(s_o - \tilde{s})$ during post-strike negotiations, as opposed to after a time period of $s_o$ during pre-strike negotiations.
These differences mean that the pre-strike shape of NW will differ from its post-strike shape—provided that either the firm experiences financial stress during the strike (i.e., b > 0) or strike insurance is paid (i.e., c > 0). If the former condition obtains, the NW function—including the firm's ruination curve will shift towards the wage axis, as the strike occurs. If the latter condition holds, the portion of the NW function that is kinked at the date when defence funds run out, also will shift towards the wage axis as \( s \) increases. Alternatively, the wage axis will shift eastwards in Figure 1 above.

2.3 The Union

The union's gain function, its net economic benefits function, \( \text{NEB} \), will be defined as follows:

\[
\text{NEB}(s, w) = \int_{s}^{\ell} (w - w_f) e^{-it} dt - \int_{0}^{s} w_f e^{-it} dt - FC_u - G(s) + SP + RP + AI
\]

where

\[
FC_u = \int_{0}^{\ell} f e^{-it} dt; \quad f > 0 \text{ and } f' = 0
\]

\[
G(s) = \int_{0}^{s} g e^{-it} dt; \quad g > 0 \text{ and } g' = 0
\]

\[
SP = \int_{0}^{s} h e^{-it} dt; \quad h > 0 \text{ and } h' = 0
\]

for \( s < m \) where \( m > 0 \)

\[
= \int_{0}^{m} h e^{-it} dt \quad \text{for } s \geq m, \text{ and}
\]

\[
AI = \int_{0}^{s} d e^{-it} dt; \quad d \geq 0 \text{ and } d' = 0.
\]
The two integral terms in equation (8) derived from Heiser (1970) and Eaton (1972).

The left-hand integral in equation (8) represents the present value of the strike-induced differential in the worker's wage bill, \((w-w_r)\), calculated from the day the strike ends, \(s\), until the workers' expected retirement date, \(\ell\), and discounted at the rate \(i\). The strike-induced wage settlement, \(w\), is measured relative to the workers' reservation wage, \(w_r\). The reservation wage is included here because the worker has the alternative of migrating. Its inclusion means that the union ruination curve makes sense, as explained below.

The reservation wage is the average maximum wage rate at which the firm's employees would leave to seek employment elsewhere. Confronted with wage dispersion and given a probability distribution corresponding to those wages, the individual employee calculates the wage rate he expects to realize through quitting the firm, becoming unemployed and seeking employment elsewhere. This wage rate is the reservation wage. It is well known from the job search literature that \(w_r\) will increase if the mean of the wage dispersion increases or if the unemployment rate decreases, and obversely.\(^{12}\)

The right-hand integral in equation (8) represents the opportunity costs to the employees of the work stoppage; it is costed at the employer's latest wage offer, \(w_f\). If the employer has made no wage offer, the latest contractual wage rate, \(w_c\), is substituted for \(w_f\).

The net return of strike action to the union's members is calculated by subtracting the opportunity costs of strike action from the

\(^{12}\)See for instance, McCall (1970) or Whipple (1973).
strike-induced benefits. Heiser and Eaton originally formulated this calculation. But, decision-makers in their models used a framework involving summations over discrete time periods as opposed to the integral framework used here.

Decision-makers in the Heiser and Eaton formulations also took the wage-employment trade-off into account. Heiser's treatment of the wage-employment trade-off is more appropriate than Eaton's for the current model. (See, for example, Appendix A, 180-182 and 186-196.)

Using Heiser's assumptions, our firm's net worth function would become

\[
NW(s,w) = \int_{s}^{\infty} \left[ \frac{QW}{(e-1)} - H \right] e^{-rt} dt - \int_{0}^{s} He^{-rt} dt - Q : F(s,w) + SI - RP
\]

where \( e \) is the elasticity of the monopolist's demand curve at \( w \). Our union's net economic benefit function would become

\[
NEB(s,w) = \int_{s}^{L} Qw(1-\eta)e^{-it} dt - \int_{0}^{s} Qwe^{-it} dt - FC_u + SP + RP + AI
\]

where \( \eta \) is the arc elasticity of the firm's demand for labour curve at \((w-w_r)\). (See Appendix A, 187-191 or Heiser, 1970, 63 and 65.)

The integral framework was selected because functions which use it can be differentiated with respect to the strike length \( s \). Unfortunately, the summations over discrete time periods which are equivalent to the left-hand integrals in (1) and (6) do not change in value when \( s \) changes. This means, for example, that the union and firm indifference curves in Heiser's theory have shapes which are much different from the shapes of the iso-NEB and iso-NW curves in this theory. (See Heiser, 1970, 61-67.) It also means that, if the supplementary functions take on a zero value in the Heiser model (as well as those of Johnston and R-S) that a corner solution is reached. (See Appendix A, 191-195; Heiser, 1970, 66; Johnston 1972a, 845-46; and R-S, 1976, 674 (substituting 0 for \( F(s) \) in equation (1)) and 676.) Indeed, Heiser in effect grafted the supplementary functions onto his model, in order to avoid these corner solutions.
$FC_u$ represents the fixed costs (FC) to the union (u) of strike activity. It is the union counterpart to the firm's $FC_f$ function. $FC_u$ (like $FC_f$) creates a disincentive for labour (management) to expect that contract negotiations strikes will be relatively short in duration (i.e., a few days).

The two terms--SP and AI--come from Eaton's theory. They respectively stand for strike pay, and alternative income. Strike pay typically is paid at a constant rate ($h$) during the strike and is so modelled above. The time period, $m$, is the time period during which strike pay is paid. The alternative income that employees earn during a strike will be modelled as though it were paid at a constant rate ($d$) to a group of "representative strikers." In particular the alternative income formulation operates as if some strikers found alternative employment immediately after the strike began and remained employed until the strike ended. As such, it evens out the customary phenomenon, that strikers spend portions of the strike duration unemployed and/or employed.

$G(s)$ is a Heiserian supplementary function. It models the financial stress that employees experience during a strike. Union financial stress, like firm financial stress, will be modelled linearly as though it were incurred at a constant rate ($g$).

Iso-net economic benefit functions will be constructed in order to present the properties of the union's net economic benefit function. Integration and simplification of (6) yields

$$NEB(s,w) = \frac{1}{i} \left\{ (w-w_r) L(e^{-is} - e^{-iL}) + \right.$$  
$$\left. L[w_r + (g-h-d)](e^{-is} - 1) + f(e^{-iL} - 1) \right\} + V \ldots (9)$$
Differentiating (7) totally and setting dNEB equal to zero, we find that the slope of the indifference curve is

\[
\frac{dw}{ds} \bigg|_{dNEB = 0} = - \frac{(\partial \text{NEB}/\partial s)}{(\partial \text{NEB}/\partial w)}
\]

where

\[
(\partial \text{NEB}/\partial s) = - [(w - w_r + w_f) L + (g-h-d)] e^{-is} \quad \ldots \quad (10)
\]

and where

\[
(\partial \text{NEB}/\partial w) = (1/i)L [e^{is} - e^{-i2}] > 0 \quad \ldots \quad (11)
\]

for realistic strike lengths \((s < \ell)\).

Generally speaking, each iso-net economic benefit function should have a positive slope, since the sign of \((\partial \text{NEB}/\partial s)\) normally should be negative for realistic wage settlements \((w > w_r)\). The latter will occur, for instance, if the employees received no alternative income \((d)\) and if the financial stress they experienced \((g)\) outweighed the strike pay they received \((h)\). Indeed, this may be the typical case.

The second derivative is (see Allen, 1965, 337-8)

\[
\frac{d^2w}{ds^2} \bigg|_{dNEB = 0} = \frac{2i}{1 - e^{is}} \left[ \frac{1}{(1 - e^{is})} \right] \frac{\partial^2}{\partial \text{NEB}^2} \left( \frac{\partial \text{NEB}}{\partial s} \right) \quad \ldots \quad (12)
\]

whose sign is ambiguous because the sign of the first derivative is ambiguous. If the first derivative is positive, the second derivative will be positive for realistic strike lengths \((s < \ell)\), and otherwise.

Iso-net economic benefit functions are depicted in Figures 1 and 2 as having a positive slope and as being convex from below. However, they could be concave from below and it would not affect our
analysis. For our analysis, the most important feature of the iso-net economic benefit functions is that they are expected to have a positive slope.

The union "ruination curve," NEB\textsubscript{0c}, constrains the union during negotiations. NEB\textsubscript{0c} is the iso-net economic benefit curve

\[
\text{NEB}_{0c} = \int_{0}^{\ell} (w - w_r) = 0
\]

NEB\textsubscript{0c}, as well as the rest of the NEB function, will rotate counterclockwise about the wage axis as time passes, because of the fixed retirement date, \(\ell\). (See equations (8), (9), (10), and (11) above.) However, this rotation will be ignored below, since it is an infestisimal rotation.

It is noteworthy that the NEB function, including the union's ruination curve, will shift in response to changes in the firm's latest wage offer, \(w_f\). Each time the firm increases (decreases) its wage offer, \(w_f\), the opportunity costs of the strike to the union,

\[
\int_{0}^{s} w_f e^{-rt} dt,
\]

will increase (decrease) for any positive strike duration. NEB (including NEB\textsubscript{0c}), consequently, will decrease (increase) in value at each strike-wage combination, \((s, w)\), where the strike length is positive (i.e., \(s > 0\)). Simply put, a higher wage rate will be required at any given strike length, in order to offset the increase in opportunity costs that is associated with the increase in \(w_f\), and obversely. By contrast, the firm's NW function (and, in turn, NW\textsubscript{0c}) is invariant with respect to changes in the union's latest wage offer, \(w_u\). (Compare
The post-strike financial stress and strike pay functions will differ from their pre-strike counterparts. The reasons for this are the same as those for the NW function, as explained above. The post-strike union financial stress and strike pay functions will be

\[ G(s) = \int_{0}^{\tilde{s}} ge^{-it} dt + \int_{0}^{S} ge^{-it} dt; \quad g > 0 \text{ and } g' = 0 \]

\[ SP = \int_{0}^{(m-\tilde{s})} he^{-it} dt; \quad h > 0 \text{ and } h' = 0 \]

for \( s > (m-\tilde{s}) \) where \( m > 0 \)

\[ = 0 \text{ for } s > (m-\tilde{s}) \text{ where } m > 0, \]

and where \( \tilde{s} \) is the strike duration to date. If \( f(h) \) is positive, then NEB (the kinks in NEB at \( (m-\tilde{s}) \)) will shift leftwards during post-strike negotiations while the strike takes place (i.e., as \( s \) increases). Alternatively, the wage axis will move eastwards in Figure 1 as \( \tilde{s} \) increases.

2.4 Features of the Two Objective Functions

The parties' objective functions reflect several of the features of actual "distributive bargaining," as Walton and McKersie term it (1964, 4). First, the wage objectives of labour and management do conflict. The union derives increased benefits from higher wage offers, \textit{ceteris paribus}, and obversely for the employer (see (5) and (11)). Second, both the union and the employer will incur higher

---

15 The union's latest wage offer, \( w_u \), if costed in (1), washes out. (See Appendix A, 198; Equation (12) and substitute \( w_u \) for \( w_m \).)
a priori costs the longer the work stoppage lasts, everything else the same. Third, the opportunity cost of a work stoppage to the firm need not—and probably will not—equal the opportunity cost of a work stoppage to the union (compare equations (1) and (8)). Fourth, bargainers are confronted with the possibility of ruination during negotiations.

2.5 Feasible Sets

There are two kinds of possible outcomes to negotiations: (1) a collective agreement is negotiated (and the bargaining relationship is not severed) or (2) either labour or labour and management end up in ruination (and the bargaining relationship is severed). The negotiation of a collective agreement may or may not be accompanied by strike action. If the firm fell into ruination it clearly would drag the union along with it. However, should the union abandon a strike, thereby attaining ruination, the firm need not join it in ruination. The firm could hire replacements for the employees who struck.

The set of strike-wage combinations which correspond to the two kinds of possible outcomes will be termed the "feasible set." The probability that negotiations will result in strike-wage combinations which are not included in the feasible set clearly is zero. The bounds of the union and firm feasible sets include segments of the wage axis and the firm ruination curve, for obvious reasons. (See Figure 3.) They also include segments of two rays, called $S_m$ and $W_{cs}$. The ray, $S_m$, parallels the wage axis at a distance $s_m$ from it. The strike length, $s_m$, is the maximum length of strike; it occurs where the union and firm ruination curves interject. (See Figure 3.) Strike lengths greater
Legend:

\[
\begin{align*}
\text{\textbackslash \textbackslash \textbackslash \textbackslash \textbackslash \textbackslash \textbackslash } & = \text{non-severance region} \\
\text{\textbackslash \textbackslash \textbackslash \textbackslash \textbackslash \textbackslash } & = \text{severance region} \\
w & = \text{wage offer (or proposed wage settlement)} \\
s & = \text{strike length} \\
s_m & = \text{maximum strike length} \\
w_{rf} & = \text{firm's reservation wage} \\
w_r & = \text{union's reservation wage} \\
w_{cs} & = \text{wage rate prevailing in competitive sector of the economy} \\
NW_{0c} & = \text{union's ruination curve} \\
NW_{0c} & = \text{firm's ruination curve}
\end{align*}
\]

Figure 3 The Actual Feasible Set
than $s_m$ are not feasible, for the union (but not necessarily the firm) will have migrated. The ray $w_{cs}$, parallels the strike axis and it corresponds to the wage rate, $w_{cs}$, which is the wage rate that prevails in the competitive sector of the economy. (See Figure 3.) Wage settlements less than $w_{cs}$ are not feasible, since the firm would lose its workforce at such a wage rate.

The union's ruination curve cuts the feasible set into two sets. Excluding the firm's ruination curve, the subset of the feasible set that lies above (below) the union's ruination curve consists of "non-severance" ("severance") outcomes to collective bargaining. (See Figure 3.) "Non-severance" outcomes are, of course, those outcomes where a labour contract is negotiated; whereas, the "severance" outcomes are those outcomes (1) where both the union and firm attain ruination or (2) where the union is broken and replaced by unorganized employees. The severance region includes the segment of the firm's ruination curve that bounds the feasible set. It also includes the region that is cross-hatched in Figure 3.

Confronted with uncertainty, each bargainer will estimate the feasible set and the non-severance and severance subsets thereof. That is, each bargainer will estimate his own, as well as his adversary's ruination curve. The own and the adversary's estimates clearly need not coincide. Furthermore, it is assumed that each bargainer will overestimate the feasible set, in order that his estimate of the feasible set includes all possible outcomes to negotiations. Thus, each bargainer's estimate of the feasible set will contain the actual feasible
set (which is depicted in Figure 3).

Bargainers in the current theory will pursue strategies which are aimed at altering their opponents' perceptions of their ruination curves. For instance, the firm will "bury its rents," as assumed above, and disguise its true profit position during negotiations. It will pursue this strategy in an attempt at convincing the union that its ruination curve lies to the left of the union's estimate. Simply put, it will pursue this strategy so that the union will underestimate the firm's "ability to pay." (The firm's "ability to pay" is the value of the firm's net worth function evaluated at a strike of zero duration and the union's reservation wage (i.e., at(0, w_r)).) 17

2.6 The Subjective Joint Probability Density Functions

Decision-makers in the current theory will assign non-negative subjective probabilities to those values of the two random variables, s and w, that lie in the feasible sets they estimated. The subjective joint probability density functions will be called \( P_{nu}(s, w | w_f) \) and \( P_{nf}(s, w, | w_u) \), where \( u \) stands for the union and \( f \) for the firm and where \( u \) is a counter variable as explained below. The union and the firm p.d.f.s respectively are conditional upon the firm's latest wage offer \( (w_f) \) and the union's latest wage offer \( (w_u) \). One side's wage offer reflects its bargaining strategy and, therefore, should cause the other side to revise its p.d.f. The chief negotiators for the union

17 In other words, the firm's "ability to pay" is the difference in net worth between the best possible outcome for the firm, that it pay union members their reservation wages, and the worst possible outcome for the firm, ruination. But the net worth function takes on a zero value at ruination.
and firm estimate $P_{nu}(s,w|w_f)$ and $P_{nf}(s,w|w_u)$ (as well as NW(s,w) and NEB(s,w)). The p.d.f.s are the chief negotiators' estimates of the probability that the final outcomes of negotiations will be any given strike-wage combination $(s,w)$.\textsuperscript{17}

The variable, $n$, is intended to capture the sequential nature of collective bargaining, in addition to the fact that the chief negotiators probably will revise their subjective p.d.f.s in the course of negotiations. They will revise their p.d.f.s in the light of new information that is exchanged at the bargaining table and, particularly, in response to the other side's latest wage offer, as noted above. The variable $n$ counts these situations as "decision points"—that is, points in time at which the chief negotiator for the firm or union makes an offer or revises his p.d.f. The counter, $n$, is set at zero when negotiations commence and increases by a value of one for each successive decision point.

It is expected that there will be a discontinuity in the union and firm p.d.f.s and that this discontinuity will occur along the wage axis for both p.d.f.s, as explained below.\textsuperscript{18} In particular,

\textsuperscript{17}The joint p.d.f.s can be regarded as the chief negotiators' estimates of the "true" p.d.f., $P_n(s,w)$, which gives the true probability that $(s,w)$ will be the final outcome to negotiations. The two subjective p.d.f.s differ from the true p.d.f. because they involve the chief negotiators' perceptions of the true p.d.f.

\textsuperscript{18}In other words, $\lim_{s \to 0} p_{nu}(s,w|w_f) \neq p_{nu}(0,w|w_f)$ and $\lim_{s \to 0} p_{nf}(s,w|w_u) \neq p_{nf}(0,w|w_u)$. 
the probability that there will be no-strike settlements (i.e., settlements along the wage axis) should be quite high (e.g., 80%); whereas, the probability that there will be strikes of very, very short duration, should be virtually zero. (See Figure 4.) A special kind of p.d.f. is required in order to capture realistically the expected discontinuity.

The union and firm p.d.f.s will be composed of two parts. One is a "singular" p.d.f.; the other is continuous. The singular p.d.f. lies along the wage axis, while the continuous p.d.f. lies within the feasible set and, more importantly, over the region of the first quadrant of S x W where strike lengths are positive. The singular p.d.f. is singular in that positive probability is concentrated along the wage axis. (See Figure 4.) Alternatively, the singular p.d.f. corresponds to the "atom of probability" which is at zero of the marginal p.d.f. of strike. (See Figure 4.)

As compared with the singular-continuous p.d.f., a p.d.f. that is continuous everywhere yields less realistic results. For instance, the probability of settling without a strike is,

\[ P_{nu}(w,s \mid s > 0) \text{ and } P_{nf}(w,s \mid s > 0). \]
Discontinuous True Marginal p.d.f. of Strike

Continuous True Marginal p.d.f. of Strike

Legend:

\[ p_n(s, w) = \text{true probability density function} \]
\[ p_n(s, w) = \text{true marginal probability density} \]
\[ \text{function of strike} \]
\[ = \text{concentration of probability of } p_n(s, w) \]
\[ \text{on the wage axis} \]

\[ s_m = \text{maximum length of strike} \]
\[ s = \text{strike length} \]
\[ \pi = \text{a very, very small positive number} \]

Figure 4  A Comparison of True Marginal p.d.f.s. of Strike for the Discontinuous and Continuous Joint p.d.f.s.
strictly speaking, zero. However, it is possible to redefine the probability of settling without a strike, so that it was calculated over an area of \( \epsilon \) width from the wage axis (where \( \epsilon \) is a very, very small positive number). But this, in turn, would mean that the probability that strikes will have very, very short duration will be much higher than seems plausible. (See Figure 4.)

2.7 The Basic Shapes of the p.d.f.s

The basic shapes of the p.d.f.s depend upon environmental factors, such as the legislative framework which governs collective bargaining and certain economic or socio-economic variables which influence the collective bargaining process. However, since these exogenous factors generally are constant during any given round of negotiations, they will be held constant for now. The economic and socio-economic variables, in particular, will be varied, however, when the "determinants" of strike activity are explained below.

Casual empiricism suggests that much of the firm and union probability distributions (e.g., 70-90%) will be associated with the singular distribution (i.e., will lie above the wage axis). Typically, some 90 percent of all contract settlements did not involve strike action. However, the percentage of each probability distribution

\[
P_{nu}(S=0) = \int_{0}^{w} p_{nu}(0,w) \, dw
\]

and

\[
P_{nf}(S=0) = \int_{0}^{w} p_{nf}(0,w) \, dw.
\]

See, for example, Woods et al., 1968, 122.
that is assigned to the wage axis probably will change during negotia-
tions. For instance, the chief negotiators for the union and firm
might assign relatively more probability to the wage axis when negoti-
ations commence than later on during negotiations, because they be-
come less confident of settling without a strike as the strike dead-
line becomes more imminent.

Casual empiricism also suggests (1) that relatively little
probability (e.g., less than 15%) will be assigned to severance, as
opposed to non-severance, outcomes to negotiations and (2) that relative-
ly more probability will be associated with severance outcomes when
negotiations are first agreement, as opposed to contract renewal, ne-
gotiations. For one, labour and management are better off in the non-
severance region than if they both incurred ruination. For another,
general labour relations laws tend to impede labour and management from
settling within the severance region of the feasible set, to the extent
that they sanction, regulate and promote collective bargaining, as ex-
plained above. Moreover, these labour statutes provide for decertifica-
tion, which is a means whereby a union can sever a bargaining relation-
ship in lieu of strike action. Nevertheless, ruination does occur.
Strike data for British Columbia indicate, for example, that less than
ten percent of all interest disputes from 1945 through 1975 concluded

---

23A union will be decertified if a majority of the employees
in the appropriate bargaining unit vote against further union repre-
sentation during a representation vote that they petitioned the appro-
priate labour relations board to hold.
in ruination.\textsuperscript{24} (See Table 8 below.) The 1945-75 B.C. strike data also reveal that about nine percent of all first agreement strikes, concluded in ruination (see Table 8). A mitigating factor here is the provision for first agreement arbitration, which a few Canadian jurisdictions adopted during the mid-1970s.\textsuperscript{25}

Given such an allocation of cumulative probabilities, we shall motivate the shapes of the union and firm p.d.f.s. through a partial analysis which focusses on two sets of cross-sections of the p.d.f.s. One set of cross-sections parallels or cuts through the wage axis and consists of the union and firm conditional p.d.f.s, \( P_{nu}(w|s;w_f) \) and \( P_{nf}(w|s;w_u) \), respectively. It will be used to analyze factors that influence wage determination. The other set of cross-sections parallels the strike axis and is comprised of the conditional p.d.f.s, \( P_{nu}(s|w;w_f) \) and \( P_{nf}(s|w;w_u) \). It will be used to analyze factors that influence the length of strikes.

\textsuperscript{24}"Ruination" includes the following types of dispute resolution: "Union abandoned strike," "employment conditions stated no longer affected (strikers replaced)" and "operations reported closed." The figures presented above underestimate the probability that first agreement and contract renewal strikes will terminate in ruination, since many modes of settlement were "not reported." It is my belief that the data concerning the incidence of ruination are fairly accurate, since ruination is such a rare and dramatic event. Newspapers which constituted an important source of information concerning modes of settlement, undoubtedly covered such sensationalistic events.

\textsuperscript{25}First agreement arbitration is a remedial action which some Canadian labour relations boards can take against bargaining in "bad faith." It clearly reduces employers' ability to drive a newly certified union into ruination during first agreement negotiations, but is not universally applied to first agreement disputes. Incidentally, British Columbia was the first jurisdiction in North America to provide for first agreement arbitration (see Appendix B, 238-239.)
The two sets of cross-sections will be combined to generate the shapes of the union and firm p.d.f.s. Significantly, there are differences as to the factors that influence wage settlements and strike lengths within the severance regions, as opposed to the non-severance regions, of the feasible sets.

Two factors primarily are expected to determine the shapes of the union and firm p.d.f.s. over the severance region of the union and firm feasible sets. One factor is that the longer the strike lasts, the greater will be the (a priori) costs to labour and management and, in turn, the smaller will be the net gains that the firm and union can achieve from resisting ruination (by allowing the strike to continue). This factor should mean that, in tracing along the union or firm resistance curves, $P_{nu}(s,w|w_f)$ and $P_{nf}(s,w|w_u)$ will rise as $s$ increases. (See Figure 5.) Furthermore, the conditional p.d.f.s, $\{P_{nu}(s,w|w_f)\}$ and $\{P_{nf}(s,w|w_u)\}$, should be monotonically increasing functions, and they should be unimodal, having a mode near the maximum strike length, $s_m$. (See Figure 5.)

The other factor is that if the firm succeeded in breaking the union and sought to hire a non-unionized workforce, it would have to pay wages in excess of those paid in the competitive sector of the economy. This is interpreted to imply that each $P_{nu}(w|s;w_f)$ and $P_{nf}(w|s;w_u)$ will be unimodal, having a mode at the wage rate that the

---

26 Nonetheless, both the union and firm would achieve a positive net gain, as compared with ruination, if the final outcome to negotiations were in the non-severance regions of the union and firm feasible sets.

27 The mode is near $s_m$, since the union and firm over-estimate the bounds of the feasible set, as explained above.
Legend:

\[ w = \text{wage} \]
\[ w_{rf} = \text{firm's reservation wage} \]
\[ w_r = \text{union's reservation wage} \]
\[ w_a = \text{wage rate for attracting a non-union workforce} \]
\[ w_{cs} = \text{wage rate that prevails in the competitive sector of the labour market} \]

\[ \text{s} = \text{strike length} \]
\[ s_m = \text{maximum strike length} \]
\[ p_n (s, w) = \text{true probability of settlement of (s, w)} \]
\[ NW_{0c} = \text{firm's ruination curve} \]
\[ NEB_{0c} = \text{union's ruination curve} \]

Figure 5  True Probabilities of Settling in the Severance Region of the Feasible Set
A firm considers necessary to attract a non-unionized workforce, $w_a$. (See Figure 5.) Combining these factors (and the corresponding cross-sections) results in the shape of the union or firm p.d.f. depicted in Figure 4. It results, in particular, in a "ridge of wage modes" which is associated with $w_a$, which runs from West to East and which attains a peak near $(s_m, w_a)$. (See Figure 5.)

The union and firm p.d.f.s are expected to have a so-called ridge of wage modes over the non-severance regions of the union and firm feasible sets, as well. Their modes are expected to lie somewhere over the range of recently negotiated comparable wage settlements (RNCWS) and to extend basically from West to East over the non-severance region.\(^{28}\) (See Figure 6.) The modes of $\{p_{nu}(w|s;w_f)\}$ and $\{p_{nf}(w|s;w_u)\}$ will be associated with the range of RNCWS for several reasons. First, the firm and union will take notice of RNCWS due to labour market competition. The firm will seek to revise its wage structure in accordance with RNCWS, if it seeks (1) to recruit or retain a reliable workforce and (2) to avoid engendering poor employee morale, thereby incurring a decline in productivity. Union members will pay heed to RNCWS as a part of their job search activities. Moreover, RNCWS establish a target range of settlements which union members will strive to achieve, if

\[^{28}\]RNCWS are comparable in the sense that they involve "job contents" similar to the firm's or that they cover employees in the same labour market as the firm's employees. RNCWS also are termed "industry standards," even though they do not necessarily establish clear-cut standards. That there will be a dispersion of RNCWS was explained above.
Firm's Joint Subjective p.d.f.

Legend:

- $w$ = wage offer (or potential settlement)
- $w_{rf}$ = firm's reservation wage
- $w_r$ = union's reservation wage
- $w_{m:nu}$ = mode of wage cross-sections of union's joint p.d.f.
- $w_{m:nf}$ = mode of wage cross-sections of firm's joint p.d.f.
- $s$ = strike length

Union's Joint Subjective p.d.f.

- $p_{nf}(s, w)$ = firm's joint subjective p.d.f.
- $p_{nu}(s, w)$ = union's joint subjective p.d.f.
- NEBOc = union's ruination curve
- NW0c = firm's ruination curve
- RNCWS = recently negotiated comparable wage settlements

Figure 6 Wage Cross-Sections of the Union and Firm Joint Subjective p.d.f.s.
not improve upon, through collective bargaining. Abstracting from influences other than labour market competition and goal-setting behaviour, RNCWS, therefore, seem to be more likely wage settlements than do other feasible wage settlements.

Barring extraordinary circumstances, such as the firm's being on the brink of ruination, relatively low probabilities should be associated with those outcomes that involve ruination or near ruination. Bargainers presumably will strongly resist ruination or near-ruination wage settlements, preferring, for example, to incur (or to continue to incur) strike action. Strike action (or the continuance thereof) presents the prospect of non-severance settlements which would confer on the bargainer threatened with ruination net-returns which exceed the net-returns of ruination. (See Figure 3 above.)

For the sake of simplicity, it will be assumed that each conditional p.d.f., \( P_{nu}(w | s; w_f) \) [\( P_{nf}(w | s; w_u) \)] has the same mode, which will be denoted as \( w_{m:nu}(w_{m:nf}) \). In other words, \( w_{m:nu}(w_{m:nf}) \) is a wage settlement towards which the chief negotiator for the union (firm) perceives that negotiations will converge, regardless of strike length.

It should be noted that three additional factors should affect the shapes of each conditional p.d.f., \( P_{nu}(w | s; w_f) \) or \( P_{nf}(w | s; w_u) \). These factors are (1) the percentage increase in the consumer price

---

29 In other words, employees will make "those invidious comparisons" with other employees' wage rates. But, their comparisons are not necessarily "coercive" comparisons, as Arthur Ross would have us believe.
index, (2) the rate of change of the change in average comparable wage settlements and (3) each bargainer's subjective estimate of his bargaining skills, as opposed to those of his opponent. Their influences on $p_{nu}(w|s;w_f)$ and $p_{nf}(w|s;w_u)$ will be explained below.

There should be a "ridge of strike modes" which lies between the wage axis and the firm or union ruination curves, depending upon whichever is closer to the wage axis. It is depicted in Figure 7. At least two factors will be influencing the parties' behaviour during the strike. On the one hand, the parties will be waiting each other out. They will be particularly reluctant to settle too quickly, since, for instance, a quick settlement might be construed as a sign of weakness and, therefore, become an undesirable precedent for future rounds of negotiations. Hence each $p_{nu}(s|w;w_f)$ [$p_{nf}(s|w;w_u)$] will take on relatively small values for short strike durations.

On the other hand, the longer the strike lasts, the greater will be the \textit{(a priori)} costs that the strike imposes on both sides and, consequently, the greater will be the inducement for both sides to settle. Since the costs that the parties incur should induce them to settle before they attain ruination, each $p_{nu}(s|w;w_f)$ [$p_{nf}(s|w;w_u)$] will take on progressively smaller values, for increasing strike lengths which are approaching the maximum strike length, $s_m$.

The strike modes of each $p_{nu}(s,w|w_f)$ and each $p_{uf}(s,w|w_u)$ are those strike lengths for which the firm and union have waited long enough and incurred sufficient costs that the time is propitious to settle. The modes of the $p_{nu}(s,w|w_f)$ and $p_{nf}(s,w|w_u)$ will be denoted as $s_{m:nu}(w)$ and $s_{m:nf}(w)$ respectively. It is noteworthy that they
**Legend:**
- \( w \) = wage offer (or potential wage settlement)
- \( w_{rf} \) = firm's reservation wage
- \( w_r \) = union's reservation wage
- \( w_{m:nu} \) = mode of wage cross-sections of union's joint p.d.f.
- \( w_{m:uf} \) = mode of wage cross-section of firm's joint p.d.f.

**Firm's Joint Subjective p.d.f.**

**Union's Joint Subjective p.d.f.**

\( s \) = strike length

NEB\(_{0c} \) = union's ruination curve
NW\(_{0c} \) = firm's ruination curve

\( p_{nf} (s, w) \) = firm's joint subjective p.d.f.

\( p_{nu} (s, w) \) = union's joint subjective p.d.f.

**Figure 7** Strike Cross-Sections of Union and Firm Joint Subjective p.d.f.s.
should change in value as the wage rate $w$, changes. (See Figure 7.)
The modes, $s_{m:nu}(w)$ and $s_{m:nf}(w)$, may be crudely estimated by referring to data concerning recent strike lengths and the corresponding wage settlements. However, due allowance must be made for differences in firms' abilities to pay and union members' reservation wages. In addition, the lengths of past strikes involving labour and management should influence the location of $s_{m:nu}(w)$ and $s_{m:nf}(w)$. Relatively long (short) strikes in the past should cause $s_{m:nu}(w)$ and $s_{m:nf}(w)$ to move away from (toward) the wage axis, cet. par.

Moreover, there should be secondary ridges of strike modes which correspond to the dates on which the firm's strike insurance fund and the union's strike fund expire. However, if the adversary does not know (and cannot estimate) the date on which the given side's defence fund will expire, the adversary's p.d.f. will not include the strike modes that correspond to this date.

The p.d.f.s that result from combining the two preceding sets of cross-sections will be bimodal. Both modes should lie along the ridge of wage modes. One mode will lie over the wage axis and should be much higher than the other mode. The other mode presumably will be at the (saddle) point where the ridge of wage modes intersects with the ridge of strike modes. (Combine Figures 6 and 7.)

The latest wage offers by the firm and union, $w_f$ and $w_u$ respectively, also determine the basic shape of the union and firm p.d.f.s. The union and firm p.d.f.s -- $p_{nu}(w,s|w_f)$ and $p_{nf}(w,s|w_u)$ -- respectively are conditional upon $w_f$ and $w_u$. This is because, in the face of imperfect information, $w_f(w_u)$ provides some information to the
union (firm) of, for example, the adversary's negotiating strategy.

Furthermore, the firm and union wage offers, in effect, will cause the union and firm p.d.f.s to become truncated during negotiations. It is assumed that bargainers adhere to an unwritten convention which typically is a part of practical negotiations and which is termed the "Retaliation Convention" here.³⁰

Retaliation Convention: Generally speaking, neither bargainer will renege on an unconditional wage offer. (A wage offer is "unconditional" if the party that made it does not stipulate that it may be withdrawn later on during negotiations.) The union (firm) is said to renege on an unconditional latest wage offer if it subsequently makes an "inferior wage offer": a wage offer which is greater than (less than) its latest wage offer. If the union or firm makes an inferior wage offer the adversary will retaliate. Retaliation will consist of a strike or lock-out. Moreover, the party that retaliates will be intent upon driving the other side into ruination rather than accept a wage offer that is inferior to the unqualified wage offer that the other side reneged on.

Thus, there presumably is a rather small (cumulative) probability (e.g., 2%) that bargainers will renege on their latest unqualified wage offers.

The effect of this convention is that each time the union or firm makes a wage offer that is not inferior to its latest wage offer, both the union and firm should reassign most of the cumulative probability that lies at or above (below) the union's (firm's) latest wage offer and at or below (above) the union's (firm's) next latest wage offer for all strike lengths. They should reassign most of this cumulative probability at the time of making, or the circumstances surrounding it have changed significantly.
probability to the region of the feasible set that lies between the firm's latest wage offer \( w_f \) and the union's latest wage offer \( w_u \) for all feasible strike lengths (i.e., for all \( s \) such that \( 0 \leq s \leq s_m \)). It is in this sense that \( w_f \) and \( w_u \) truncate the union and firm p.d.f.s. Some positive cumulative probability should remain between the union's (firm's) latest wage offer and its next latest wage offer for all strike lengths, since it may renege on its most recent wage offer later on during negotiations.

2.8 Objective Functions and Decision Rules

The union and firm seek to maximize the objective functions that follow:

\[
\text{Union:} \quad \int_0^\infty \text{NEB} (0,w) \, p_{nu} (0,w|w_f) \, dw + \lim_{\delta \to 0} \left[ \int_0^\infty \text{NEB} (s,w) \, p_{nu} (s,w|w_f) \, dw \, ds \right] \geq 0 \quad \ldots (13)
\]

\[
\text{Firm:} \quad \int_0^\infty \text{NW} (0,w) \, p_{nf} (0,w|w_u) \, dw + \lim_{\delta \to 0} \left[ \int_0^\infty \text{NW} (s,w) \, p_{nf} (s,w|w_f) \, dw \, ds \right] \geq 0 \quad \ldots (14)
\]

where delta (\( \delta \)) is a very small positive number. The lefthand (righthand) integrals in equations (13) and (14) involve the singular (continuous) portions of the union and firm p.d.f.s. The requirement that equations (13) and (14) must either equal or exceed zero in value reflects the fact that the firm and union are constrained by ruination.
The union and firm decision rules derive from, and involve variants of, their respective objective functions.

At the commencement of negotiations, the firm and union will determine their initial wage offers, \( w_u \) and \( w_f \) respectively. The firm (union) will calculate its optimal wage offer, \( w_f^* \) (\( w_u^* \)), and then deflate \( w_f^* \) (inflate \( w_u^* \)) in order to determine \( w_f \) (\( w_u \)). The optimal wage offers, \( w_f^* \) and \( w_u^* \), are the wage offers, \( w_k \) and \( w_l \) respectively, that maximize the following expressions:

\[
ER_f (w_k) = NW (0, w_k) p_{nf} (w_k | s = 0; w_u) + \\
\lim_{\delta \to 0} \int_{0}^{\infty} NW (s, w_k) p_{nf} (w_k | s; w_u) \, ds 
\]

\[
ER_u (w_l) = NEB (0, w_l) p_{nu} (w_l | s = 0; w_f) + \\
\lim_{\delta \to 0} \int_{0}^{\infty} NEB (s, w_l) p_{nu} (w_l | s; w_f) \, ds 
\]

where \( ER_f (w_k) \) and \( ER_u (w_l) \) respectively represent the expected returns (ER) to the firm (f) and union (u) from \( w_k \) and \( w_l \). The firm and union will determine their initial (or subsequent) wage offers as follows

\[
w_f = w_f^* - \alpha; \alpha > 0 \text{ and } \alpha' = 0 
\]

\[
w_u = w_u^* + \beta; \beta > 0 \text{ and } \beta' = 0 
\]

The positive constants, \( \alpha \) and \( \beta \), are included in equations (15) and (16) for two reasons. First, \( \alpha \) and \( \beta \) provide the firm and union room to maneuver during negotiations. Second, the firm (union) may agree to wage settlement that exceeds (is less than) \( w_u^* \) (\( w_f^* \)). It is assumed that \( w_u \) and \( w_f \)
will not increase in value and that they most likely will decrease in value during negotiations. This assumption clearly is consistent with the Retaliation Convention if \( w_u^* (w_f^*) \) remain constant.

Equations (13) - (16) greatly oversimplify the determination of \( w_u^*, w_f^*, w_u \) and \( w_f \), because they ignore the fact that \( p_{nu}(s, w|w_f) \) and \( p_{nf}(s, w|w_u) \) are conditional upon \( w_f \) and \( w_u \) respectively. Ideally, the firm's (union's) chief negotiator, in calculating his optimal wage offer, should take into consideration that his wage offer will influence the adversary's counteroffer through the adversary's p.d.f. (See equations (13) [(14)] above.) The adversary's counteroffer, in turn, will affect the firm's (union's) counteroffer through the firm's (union's) p.d.f., and so forth. Unfortunately, it is virtually impossible to model the effects on \( w_f^*, w_u^*, w_f, \) and \( w_u \) that are associated with such interdependencies between one side's wage offer and the other side's counter-offer. Equations (13) - (16) abstracted from such interdependencies for this reason.

It should be noted that the optimal wage offers, \( w_u^* \) and \( w_f^* \), should take on values which are close to the values of the wage rates that correspond to the modes of \( p_{nu}(w|s = 0; w_f), p_{nu}(w|s \geq 0; w_f), p_{nf}(w|s = 0; w_u), \) and \( p_{nf}(w|s \geq 0; w_u); w_{m:nu} \) and \( w_{m:nf} \) respectively. Indeed, if \( NW(0, w_k) \) and \( NW(s, w_k) \) [NEB(0, \( w_1 \)] and \( NEB(s, w_1) \)] remained constant, \( w_f^* (w_u^*) \) would occur at \( w_{m:nu} \) and \( w_{m:nf} \) respectively. (See equations (13) and (14).) However, since \( NW \) (NEB) increases as the

---

31Such interdependencies between one party's wage offer and the adversary's counteroffer involve what Coddington terms "higher levels" of decision-making (1968, 64).
wage rate decreases (increases), \( w_f^* (w_u^* ) \) should be less than (greater than) \( m_{nf} (m_{nu}) \). Moreover, the less widely \( p_{nf} (w|s = 0; w_f) \) and \( p_{nf} (w|s \geq 0; w_f) \) [\( p_{nu} (w|s = 0; w_u) \) and \( p_{nu} (w|s \geq 0; w_u) \)] are dispersed about \( m_{nf} (m_{nu}) \) the greater will be \( m_{nf} (m_{nu}) \), and obversely, (see equations (13) and (14)).

Let us assume that the union (firm) will select one of three possible courses of action: (1) to accept the union's (firm's) latest wage offer, (2) to make a counteroffer and (3) to lock out or force a union-initiated strike (to strike). The last option is whether or not to continue to lockout or take a strike (to strike) during post-strike negotiations. The firm's (union's) chief negotiator will calculate the expected returns that are associated with each of the three options he faces when confronted with the union's (firm's) wage offer.

The returns that are expected to accrue to the union or firm from accepting the other side's latest wage offer will be termed "certain returns" (CR) and calculated as follows:

\[
CR_u = NEB (0, w_f) \quad \ldots (17)
\]

\[
CR_f = NW (0, w_u) \quad \ldots (18)
\]

where \( u \) and \( f \) respectively stand for union and firm. The expected returns that are associated with making a counteroffer are \( ER_u (w_u) \) for the union and \( ER_f (w_f) \) for the firm, as calculated in equations (13) and (14) respectively.
The expected returns to the union \((u)\) and firm \((f)\) from striking are

\[
ER_{su} = \lim_{\delta \to 0} \int_{0}^{\infty} \int_{0}^{\infty} \text{NEB}(s, w) p_{nu}(s, w \mid s > 0; w_f) \, dw \, ds
\]

\(\ldots \)  (19)

\[
ER_{sf} = \lim_{\delta \to 0} \int_{0}^{\infty} \int_{0}^{\infty} \text{NW}(s, w) p_{nf}(s, w \mid s > 0; w_u) \, dw \, ds
\]

\(\ldots \)  (20)

where the subscript \(s\) in \(ER_{su}\) and \(ER_{sf}\) represents striking.

The chief negotiator for the firm (union) will apply Decision Rule 1 (DR1) each time the union (firm) has just made a wage offer:

**Decision Rule 1**: The chief negotiator for the union or firm will select the option which yields the greatest returns, whether expected or certain. If the firm's (union's) chief negotiator decides to make a counteroffer, the counteroffer will be determined according to equation\([15], [16]\).\(^{32}\)

An important feature of Decision Rule 1 is that it can give rise not only to non-strike settlements but also to strike-accompanied settlements.

2.9 **The Course of Negotiations: Concessionary Behaviour, Impasses and Settlements**

In applying Decision Rule 1, the chief negotiators for the union and firm may engage in concessionary behaviour, attain impasses or both. Several features of the current bargaining theory will shape

\(^{32}\)If \(w_f^*\) equals \(w_u^*\) --which is very unlikely--a "point contract zone" is said to exist. Our terminology follows the terminology of Walton and McKersie (1965).
the course of negotiations during pre- or post-strike negotiations.

One concession-generating or impasse-generating feature of the current theory is the relationship between the firm's optimal wage offer, $w_f^*$, and the union's optimal wage offer, $w_u^*$. If $w_f^*$ is greater (less) than $w_u^*$, a "positive (negative) contract zone" is said to exist. A positive (negative) contract zone will exist if the union and firm negotiators each estimate that their own bargaining skills are inferior (superior) to the other's bargaining skills. This result obtains because the union's (firm's) chief negotiator will shift his ridge of wage modes downwards (upwards) to the extent that he perceives that his bargaining skills are inferior to those of his counterpart, and obversely. The parties' wage modes largely determine their optimal wage offers as explained above.

The existence of a positive (negative) contract zone is a necessary condition for a non-strike (strike-accompanied) settlement. This is because the firm and union negotiators use $w_f^*$ and $w_u^*$ respectively in determining their wage offers, $w_f$ and $w_u$, and because the positive additive factors that they apply to $w_f^*$ and $w_u^*$ to determine $w_f$ and $w_u$ presumably will diminish in value as negotiations take place. (See equations (15) and (16) above.) Furthermore, the greater (lower) is the absolute value of $(w_f^*-w_u^*)$, the greater is the probability of a non-strike (strike-accompanied) settlement, everything else the same.

33 If the parties were negotiating to renew a past agreement, rather than for a first agreement, the union's (firm's) chief negotiator undoubtedly would use the parties' past history of negotiations to assess the probability of his exacting various wage settlements from the firm. In particular, he would compare the parties' past wage settlements with contemporary wage settlements that were negotiated for comparable jobs elsewhere.
Given that there is a negative or positive contract zone, the factors that alter either the union or firm net-gain functions or their subjective joint p.d.f.s will influence the course of negotiations. Changes in NW, NEB, \( p_{nu} \), and \( p_{nf} \) clearly change the expected (or certain) returns for each of the three options that bargainers consider in applying Decision Rule 1. Changes in certain factors will cause NW and NEB to shift; whereas, changes in certain other factors will cause the boundaries of the joint p.d.f.s to change, thereby necessitating that bargainers resign their respective p.d.f.s. Included among the "boundaries of the joint p.d.f.s" are the union and firm's ruination curves, the minimum wage ray and the horizontal rays that correspond to the union and firm's latest wage offers, provided that the latter are unconditional wage offers so that the Retaliation Convention applies. The union and firm p.d.f.s will be held constant, so that we can focus on shifts of NEB and NW in the analysis that follows.

Strike costs are one of the principal factors that bring about shifts of NW and NEB during negotiations. Strike cost-induced shifts of NW and NEB take place during post-strike negotiations but not during pre-strike negotiations.

There are two reasons that strike costs will not cause NW or NEB to shift during pre-strike negotiations. First, the pre-strike formulations of NW and NEB include a priori costs but no a posteriori costs. In other words, since no strike has commenced, no real economic costs of past strike action (i.e., a posteriori strike costs) are added to the costs of future strike action (i.e., a priori strike costs).
This means, in turn, that the *a priori* costs for a strike of any given length will remain constant during pre-strike negotiations. Second, NW and NEB involve long time horizons: ° and ℓ. The constancy of *a priori* strike costs and the firm's infinite time horizon mean that the firm's NW functions will be completely invariant with respect to time during pre-strike negotiations. NEB, in effect, will be invariant with respect to changes in time which are very small relative to the union members' earning spans, ℓ.  

Time changes during pre-strike negotiations (and typically during post-strike negotiations) are very small relative to ℓ.  

By contrast, both NW and NEB will shift towards the wage axis during post-strike negotiations. This occurs in response to the financial stress that the union and firm experience during the strike, as explained above. Financial stress will affect NEB (NW) uniformly, in the sense that a constant amount of financial stress will be subtracted from NEB (s,w) [NW(s,w)] for any given wage strike combination (s,w), at any given point in time during the strike. Thus, CR_u, ER_{su} and ER_u(w_*) [CR_f, ER_{sf} and ER_f(w_*)] will be reduced by a common fixed amount. In short, their relative values will not change.

---

34 NEB will rotate infinitesimally towards the wage axis in response to the passage of time. However, these infinitesimal changes will be ignored, as explained above.

35 Even though NEB and NW remain static, strike costs create an incentive for the parties' reaching a non-strike settlement, as opposed to a strike-accompanied settlement during pre-strike (or post-strike) negotiations. Strike-accompanied settlements confer lower own returns on the parties than do non-strike settlements, *cet. par.* In other words, NEB and NW decrease as s increases, everything else the same. (See p.p. 37-38 above.)

36 See pages 30 and 37 above.
If defence funds exist, the parts of NW and NEB which are kinked where defence funds become exhausted will shift towards the wage axis, as explained above. This shift will decrease the values of $ER_{su}$ and $ER_u(w^*)$ [$ER_{sf}$ and $ER_f(w^*)$] relative to the value of $CR_u$ ($CR_f$), everything else the same. Such a result obtains because, as the strike progresses, an increasingly smaller proportion of the non-severance region of the feasible set includes payments from the defence fund. The greatest drop in $ER_{su}$ and $ER_u(w^*)$ [$ER_{sf}$ and $ER_f(w^*)$] relative to $CR_u$ ($CR_f$) will have occurred when the union's (firm's) defence fund very nearly has expired. Once it has expired, $CR_u$ ($CR_f$) will increase in value relative to $ER_{su}$ and $ER_u(w^*)$ [$ER_{sf}$ and $ER_f(w^*)$]. Thus, the payment of strike insurance or strike pay enables labour and management to better withstand a strike but it also creates an incentive for them to settle once the strike has commenced and before these funds have been depleted, *cet. par.*

One other factor—increases (decreases) in the firm's latest wage offer, $w_f$—will cause the union's NEB function to rotate towards (away from) the wage axis during both pre-strike and post-strike negotiations. (See pages 36-37—above.) The rotation towards (away from) the wage axis will generate an incentive (disincentive) for the union to accept the firm's latest wage offer, everything else the same. As $w_f$ increases (decreases), the opportunity costs of strike increase (decrease), everything else the same. The expected benefits to the union of striking, $EB_{su}$, consequently, will decrease. But certain returns to the union of accepting $w_f$, $CR_u$, will remain constant, since they are calculated at a strike length of zero.
The foregoing partial equilibrium analysis presupposed that the union and firm p.d.f.s remained the same and, therefore, that the boundaries of these p.d.f.s did not move. However, an increase in the firm's latest wage offer will cause the union's ruination curve to rotate towards the wage axis during negotiations. In addition, the real costs of financial stress will cause the firm and union ruination curves to shift towards the wage axis during post-strike negotiations. Any such movement of the union and/or firm ruination curves requires that the union and firm chief negotiators reassign their respective p.d.f.s. In particular, the bargainers must reassign those probabilities which formerly lay either within the non-severance region of the feasible set or within the feasible set but which respectively lie either outside the current non-severance region of the feasible set or outside the current feasible set.

Two other factors will cause bargainers to reassign probabilities: unconditional new wage offers by either side and credible threats (including credible bluffs). Unconditional new wage offers necessitate that both parties simultaneously reassign probabilities because the Retaliation Convention takes effect once they are made, as explained above. The union and firm p.d.f.s involve subjective assessments, perceptions and expectations. A credible threat or a credible bluff, therefore, should cause the bargainer who was threatened or bluffed to reassign probabilities.\(^{37}\)

\(^{37}\)Schelling's (1956) work is perhaps the definitive work on the credibility of threats and negotiations.
The extent to which a threat (or bluff) will induce the opponent to alter his p.d.f. obviously depends upon the degree to which the threat is credible. For instance, a firm--particularly a firm involved in first contract negotiations--might so convince the union that it will drive the union into ruination that the union will assign, say, ninety percent of its probability distribution to severance outcomes. Or, the firm (union) might convince the union (firm) that it is very determined to withstand a strike (to stand out a long time), thereby causing the union (firm) to shift its ridge of strike modes farther away from the wage axis (see Figure 6). Alternatively, the firm's (union's) chief negotiator could attempt to induce the opponent to revise downwards (upwards) his estimate of his relative bargaining skills by threatening to strike, or to continue to strike, rather than accepting the kind of offers the union (firm) has placed on the bargaining table. This means that $w_u^* (w_f^*)$ would shift downwards (upwards).

Significantly, unconditional wage offers and credible threats (or credible bluffs) will cause bargainers to revise their probability assessments during both pre-strike and post-strike negotiations. Bargainers will reassign probabilities in one of three ways: uniformly, subjectively, or both uniformly and subjectively. A "uniform" reassignment of probability means that the (cumulative) probability that is to be reassigned over the new feasible set, as constrained by the parties' unconditional wage offers, is reassigned uniformly over the new feasible

---

38 The bargainer may enhance the credibility of his threat to strike by invoking the "hands-tied" argument that his constituency will never accede to such proposed wage settlements. Of course, the "hands-tied" argument may backfire.
A "subjective" reassignment of the union or firm p.d.f.s involves a change in bargainers' subjective assessments, perceptions or expectations. It, therefore, generally will involve a non-uniform reallocation of probabilities. Furthermore, it need not be brought about by a change in the boundaries of the feasible set but may occur, for example, due to a credible threat that the opponent issued.

Two additional factors will bring about subjective revisions of the union and firm p.d.f.s. One factor is a posteriori strike costs, whose function in collective bargaining is to induce bargainers to revise their subjective assessments, perceptions and expectations. (See, for instance, Dunlop (1967).) The other factor is the opponent's wage offer, since each side's p.d.f. is conditional upon it.

Under certain circumstances, there is a higher probability of settlement if at least one bargainer reassigns probabilities subjectively, as opposed to uniformly. A uniform redistribution of probabilities preserves the underlying shape of the bargainer's p.d.f.s. The bargainer's optimal wage offer should not change much if bargainers reassign probabilities uniformly, provided that the wage mode of the bargainer's p.d.f. lies between the parties' latest wage offers. By contrast, a subjective reassignment of probabilities which is brought about, say, by a credible threat will decrease (increase) the union's (firm's) optimal wage offer if it caused the union (firm) negotiator to lower (raise) the ridge of wage modes in his p.d.f.

In the final analysis, unconditional wage offers play a key role in setting concession-generating or impasse-generating forces into motion during both pre- and post-strike negotiations in this theory, for they require that both bargainers simultaneously revise their p.d.f.s.
A *posteriori* strike costs may prolong the impasse or provide a stimulus to settle during post-strike negotiations. Subjective revisions of the union and firm p.d.f.s. will promote concessionary behaviour, if they involve the union (firm) chief negotiator in lowering (raising) the ridge of wage modes in his p.d.f. The latter causes the union's (firm's) optimal wage offer to decrease (increase). The subjective nature of the union and firm p.d.f.s renders the current theory indeterminate.

2.10 **Strike Measures and Strike "Determinants"

The current theory models two strike decisions: (1) whether or not to strike and (2) whether or not to continue to strike once strike action has commenced. The former decision suggests two macro-level strike measures: the number of strikes and the incidence of strikes. The incidence of contract renewal strikes is, for example, the ratio of the number of such strikes to the number of collective agreements that have expired. The latter decision suggests the average duration of strike activity as a macro-level strike measure.

The "determinants" that influence the three strike measures presented are those exogenous factors that may change from one round of negotiations to the next. Three such measures were explained above in the presentation of the current theory. They included the past history of negotiations, if any; recently negotiated comparable wage settlements; and the deadlines at which strike funds cease. There are several other exogenous determinants of strike activity.

Two "determinants" of strike activity directly influence the determination of \( w_f^* \) and \( w_u^* \) and thereby influence whether the contract zone will be positive or negative. One factor is the *percentage change in the consumer price index* (\( \% \text{ CPI} \)) or \( \frac{\Delta \text{CPI}_t}{\text{CPI}_{t-1}} \) where CPI
stands for the consumer price index and \( t \) for the current year. The other factor is the rate of change of the change in recently negotiated comparable wage settlements or

\[
\frac{\Delta W_t}{\Delta W_{t-1}} = \frac{(W_t - W_{t-1})}{(W_{t-1} - W_{t-2})}
\]

where \( W_t \) represents average comparable wage settlements during year \( t \).

The percentage change in CPI or \( %CPI \) is an "orbit of comparison" that labour and management often refer to during practical negotiations. It is assumed that bargainers in the current theory will strive for percentage wage increases which match the percentage increase in the CPI, if it is to their advantage. In any case, if the wage rate that corresponds to \( %CPI \) does not equal the wage that corresponds to the union or firm wage mode (i.e., \( w_{m:nu} \) or \( w_{m:mf} \) respectively), there will be a second ridge of wage modes at the wage rate corresponding to \( %CPI \). The firm's (union's) optimal wage offer, in turn, may be associated with the ridge of wage modes at the wage rate corresponding to \( %CPI \). In general, though, it is expected that \( w_f^* \) or \( w_u^* \) will correspond to the ridge of wage modes that correspond to recently negotiated wage settlements, as explained above.

We include \( \Delta W_t/\Delta W_{t-1} \) here because chief negotiators for the firm and union presumably will look at comparable wage settlements that were attained during past rounds of negotiations, in an attempt at forecasting the outcome of their current negotiations. It is assumed that

\[39\text{See, for example, Sloane and Whitney (1972, 271-274).}\]
they use a modified (second) derivative rule for forecasting purposes:

\[ |\Delta W_t / \Delta W_{t-1} - 1| \] ... (21)

Expression (21) measures the extent to which wage increases (or decreases) remained constant during the past three rounds of annual negotiations. Indeed, the larger (smaller) is expression (21) the greater (smaller) is the rate of change of wage increases (decreases). It should be pointed out that \( \Delta W_t / \Delta W_{t-1} \) (and, therefore, expression (21)) will be close proxies for the rate of change in percentage wage changes (and their deviation from 1), if wage rates or salaries are several hundred-fold larger than one (e.g., 700¢/hr) and if percentage changes in wage rates are less than, say, ten percent—which is what we observe.

Expression (21), in effect, is an indicator of labour and management's expectations concerning future wage increases. Suppose that past rates of changes, \( \Delta W_t \) and \( \Delta W_{t-1} \), were roughly the same. In other words, suppose that expression (21) had a value very close to zero. In this case, it is assumed (1) that there will be a relatively narrow dispersion of each conditional p.d.f., \( p_{nu}(w|s;w_f) \) \( [p_{nf}(w|s;w_u)] \), about its mode, \( w_{nu} \) \( [w_{nf}] \) and (2) that the mode of each \( p_{nu}(w|s;w_f) \) \( [p_{nf}(w|s;w_u)] \) will be higher than otherwise. In short, the chief negotiators for both sides should be more certain as to where they might settle than otherwise, cet. par. Conversely, it is assumed that the more expression (21) deviates from 1, the wider will the dispersion of each conditional p.d.f., \( p_{nu}(w|s;w_f) \) \( [p_{nf}(w|s;w_u)] \), about its mode, \( w_{nu} \) \( [w_{nf}] \) and the lower will be the mode of each \( p_{nu}(w|s;w_f) \) \( [p_{nf}(w|s;w_u)] \).

---

40 Other rules such as the integral rule could have been used but were considered less realistic than the derivative rule.
This means, in turn, that $w_f^*$ ($w_u^*$) will decrease (increase) in value, cet. par., as expression (21) increases in value and vice versa. There are two reasons this occurs. First, probability is shifted away from the mode towards wage rates at which the NEB and NW functions take on higher values, thereby increasing the expected benefits that are associated with these wage rates. (See equations (13) and (14).) Second, NW (NEB) increases in value as the wage rate decreases (increases). (See equations (5) and (11).)

Four additional strike "determinants" influence the shape of the union and firm p.d.f.s by affecting the location of the union and firm ruination curves. They include (1) the normal rate of return, (2) the unemployment rate, (3) recently negotiated comparable wage settlements, and (4) the average age of the workforce. The higher is the normal rate of return, the lower will be the firm's ruination curve and, therefore, its ability to pay, and obversely. The lower is the unemployment rate or the higher is RNCWS, the higher will be the union's reservation wage, $w_p$, (as explained above) and, consequently, the higher will be the union's ruination curve and vice versa. There may be a positive correlation between the unemployment rate and the normal rate of return, so that increases (decreases) in the unemployment rate will cause the firm's ruination curve to shift downwards (upwards). The greater the average age of the workforce, the shorter will be the earning span for the workforce and obversely. \footnote{Changes in the average age of the workforce should have an insignificant impact on NEB (including NEB$_0$). They influence future earnings which occur at the end of workers' earning spans and whose discounted present value, therefore, is very small.} It should be noted that the
four factors listed above are shift parameters not only for the union and firm ruination curves but also for their net gain functions. Significantly, changes in any of the four shift parameters will cause bargainers to reassign probabilities, as explained above.

The bilateral or two-sided nature of negotiations within the current theory means that labour and management jointly determine the outcome of negotiations. The current theory, however, is an indeterminate theory. It is indeterminate, partly due to the existence of uncertainty and, in turn, partly due to the subjective nature of the union and firm p.d.f.s. It is possible to indicate how changes in the strike "determinants" influence bargainers' decision frameworks, as explained above. However, the indeterminate nature of the current theory means that we cannot predict how changes in any of the strike "determinants" will influence the decision to strike or the decision to continue to strike, if a strike is taking palce.

2.3 Extensions and Contributions

At least two features of labour legislation other than the ones that already are a part of the current theory can be built into it. The two features involve (1) secret strike ballots and (2) third-party intervention. The general labour relations laws of British Columbia and several other Canadian jurisdictions call for secret strike votes among union members and secret lockout votes among employers' associations. They also make provisions for third-party intervention.

Each union member constructs and applies the objective function that was set out above. Following Eaton (1972) let us assume
that the employer's latest wage offer still is on the table. The
union member votes in favour of (against) striking if the expected
returns from striking, \( ER_{su} \), exceed (are less than) the certain returns
from accepting the employer's latest wage offer, \( CR_u \). An important
difference between this decision rule and Eaton's decision rule is
that the decision rule includes probabilities and, in turn, involves
expected benefits.  

Following Hicks (1966, 148) and Stevens (1968, 75), the
role that mediators play in the current theory is in altering the
shapes of the union and the firm p.d.f.s by facilitating the inter­
change of information at the bargaining table and by proposing face­
saving alternatives. Intervention by interest arbitrators or concili­
ation boards can be built into the current theory, as well. Typically,
when bargainers perceive that interest arbitrators or conciliation
boards will split the differences between final offers by the union
and firm, the concessionary process is blunted. Bargainers hold back
concessions.

The holding back of concessions can be modelled in the
current theory as follows. The chief negotiator for the firm (union)
shifts the ridge of wage modes downwards (upwards), because he con­
sciously over-estimates how well he might do through arbitration or be­
fore a conciliation board. This creates a negative contract zone,
blunting further concession-making, everything else the same. However,

42Incidentally, a firm that belonged to an employers' asso­
ciation could apply the firm's decision framework in an analogous manner
during a lockout vote among the members of the employers' association.
the threat of arbitration, which is intended to simulate the threat of
the strike in conventional collective bargaining, may cause him to re­
verse his expectations as to how well he might fare through arbitration.
The threat of establishing a conciliation board may have an analogous
effect.

Long-term strike-as-an-investment behaviour could be brought
not only into the union and firm p.d.f.s but also into bargainers' net-
gain functions. Conceptually, the capitalized future benefits that
bargainers would derive from each current outcome could be added onto
the NEB and NW functions. However, this is not a simple matter to im­
plement.

The current theory suggests what might be a fruitful empirical
endeavour. The empirical endeavour is to study the manner in which
(1) chief negotiators construct (or might construct) the subjective
joint p.d.f.s and (2) the p.d.f.s change during actual negotiations. 43

The current theory portrays--hopefully in a plausible manner--
the way in which selected economic variables might influence, in part,
the joint process whereby wages are determined, along with the duration
of strike activity. The economic variables that the theory focusses on
include the following: the unemployment rate (U), recent changes in
the consumer price index (%CPI), the rate of increase in comparable
wage settlements during past negotiations (|ΔW_t/ΔW_{t-1} - 1|), the
average age of the workforce (A), the firm's ability to pay (or profits,
P), and recently negotiated comparable wage settlements (RNCWS).

43See, for example, Spetler and Stael von Holstein (1975).
The main contribution of this theory is that it provides a broad conceptual framework for portraying and analyzing collective bargaining. Indeed, several bargaining models which preceded the current one appear to be submodels of the current one. For example, the Johnston and Rabinovitch and Swary theories involve net-gain functions which are similar those of the current theory. Moreover, they include cumulative probability distributions which can be derived marginally from the firm and union p.d.f.s in our formulation. (See Appendix A.) The decision-making process of the current theory which simultaneously compares the expected returns of three options extends the two-step decision-making process found in Johnston's theory.

The three-dimensional decision-making of the current model seems to improve on the two-dimensional decision-making of the Johnston and Rabinovitch and Swary models. In particular, Johnston's and Rabinovitch and Swary's bargainers rely in their decision-making upon a single expected concession curve which is derived rather artificially. Our bargainers consider an infinite number of possible paths in their decision-making and use subjective p.d.f.s which hopefully are reasonably well motivated.

The current theory also could collapse into a two-dimensional theory like the theory of pre-strike negotiations that Walton and McKersie propounded. Indeed, the contract zones of this theory resemble, and were suggested by, Walton and McKersie's contract zones. Though apparently less well-formalized, the expected return calculations that Walton and McKersie's bargainers make resemble the ones our bargainers make.
Another contribution of the current theory is that, like the Walton and McKersie theory, it embodies certain institutional influences on collective bargaining. They include the parties' past history of negotiations, bargainers' subjective estimates of the impact of their bargaining skills on negotiations, strike-wage outcomes elsewhere, and the existence/non-existence of defence funds.

2.11 Conclusion

We formulated a broad conceptual framework which hopefully provides realistic insights concerning (1) the collective bargaining process and, in particular, the role of the strike (or strike threat) in breaking impasses, (2) economic variables and institutional factors which influence the collective bargaining process and (3) the manner in which labour legislation impinges upon and affects the collective bargaining process.

The economic "determinants" of strike activity that the current theory suggested will be applied empirically in Chapter 4. It is intended that Chapter 3 establish the empirical background for the findings of the regression analysis that are presented in Chapter 4. Chapter 3 focuses on the labour legislation-strike relationship.
CHAPTER 3

PUBLIC POLICY AND THE RESOLUTION OF INDUSTRIAL DISPUTES
THROUGH STRIKE ACTION IN BRITISH COLUMBIA 1945-75

The focus of this chapter is on public policy and the resolution of industrial conflicts through strike action. It will begin with an explanation of changes in the policies that British Columbia instituted for regulating collective bargaining and strike activity. Features of strike activity in British Columbia will be discussed next. Significantly, strike activity will be classified according to contract status: first agreement, contract renewal and during the term. Then, four selected issues of public policy and strike activity will be discussed. Three of the issues concern (1) the legality of strike activity, (2) the extent to which governments of British Columbia have intervened to end strikes and (3) the nature of wildcat strikes and possible explanations of such strikes. The fourth issue is whether first agreement strikes, contract renewal strikes and strikes during the term differ in kind or in degree. If they differ in kind for British Columbia, it casts some doubt on the validity of policy prescriptions which were based on studies outside British Columbia where the three strike series were pooled into one set of strike data.
3.1 Changes in the General Labour Relations of British Columbia: 1945-75

There were, perhaps, three key trends to the evolution of the general labour relations statutes of British Columbia from 1945 through 1975. First, these statutes changed with respect to what constituted lawful, as opposed to unlawful activity, and the methods for dealing with unlawful activity. For instance, the definition of lawful picketing was expanded, less litigation took place and fewer fines were levied against unlawful strike activity during 1974-75 than before. Second, accommodative modes of third-party intervention generally supplanted normative (or adjudicative) modes of third-party intervention by 1975. The latter (including, e.g., arbitration) involve court-like proceedings and the issuance of awards by disinterested third parties. Thus, they function outside the collective bargaining process. By contrast, the former (including, e.g., mediation) operate within—and are intended to facilitate—the collective bargaining process. Third, governments of British Columbia applied a modified "arsenal of weapons" philosophy of third party intervention throughout the 1974-75 period.

That is, they generally kept in readiness certain weapons (e.g., trusteeship, seizure, high-level mediation, and back-to-work legislation), and they invoked them "as a last resort".

1 See Appendix B for a chronological, more detailed explanation of the manner in which the general labour relations statutes of British Columbia changed.

2 The federal government regulated labour relations in British Columbia from 1945 to the end of the first half of 1947.
The general labour relations laws declared that all strikes during the term were unlawful. They also established certain preconditions which were to be met before a strike arising out of contract negotiations would constitute a lawful strike. The preconditions changed over time. At a minimum a contract negotiations strike would be an unlawful strike if any of the collective bargaining procedures that follow were not met:

(i) notice to commence negotiations had not been served or it had not been served within a set time period;
(ii) the conciliation officer, mediation officer, or conciliation board had not "booked off" officially from the dispute;
(iii) a secret strike or lockout vote had not been held.\(^3\)
(iv) strike or lockout notice had not been served or the strike commenced during the 48 or 72 hours of "grace" that was to follow the serving of notice to strike or lockout.

From 1945 through 1972 the preconditions for lawful strike action also included compliance with compulsory two-stage conciliation procedures and requests that government-supervised strike or lockout votes be conducted.\(^4\)

---

\(^3\) Lockout votes must be conducted among those firms that belong to an employers' association. Obviously, an employer who does not belong to an employers' association need not conduct a lockout vote.

\(^4\) For a discussion of the relationship between government-supervised votes and strike activity, see Anton (1975) or Appendix B, 221-222.
The acts spelled out penalties for unlawful strike action, and remedial action could be gained either through the court system (providing in some instances, that consent to prosecute had been granted) or through the B.C. Labour Relations Board. Courts determined the legality or illegality of strikes, issued injunctions concerning picketing and prescribed remedial measures from 1945 through 1974. Punitive measures were the primary method by which governments of B.C. dealt with unlawful strike activity, particularly strikes during the term, at this time. For instance, governments enacted legislative changes (1) which increased the amount of fines that could be levied against unlawful strikers (1947, 1954 and 1959); (2) which empowered the minister of labour to decertify a union that struck illegally (1954); and (3) which required that union officials prove they had not called wildcat strikes and which permitted employers to take civil action against unions that struck unlawfully (in 1959).\(^5\)

Since 1974, the B.C. Labour Relations Board has exercised nearly all of the responsibilities concerning strikes, lockouts and picketing that the courts formerly exercised.\(^6\) Signifi-

---

\(^5\) See, for example, Carrothers (1959) or Carrothers (1954).

cantly, the B.C. Labour Relations Board attempts to effect the resolution of industrial disputes through accommodative modes of third party intervention (e.g., send out industrial relations officers to mediate disputes). However, the precedent for sending out field officers to intervene in rights disputes was first established in an amendment of 1963 to the Labour Relations Act.\footnote{7}

The Labour Relations Board of British Columbia generally eschewed litigious solutions since 1974. Nevertheless, it did exercise its responsibilities in interpreting and applying the sections of the relevant legislation that dealt with unlawful strike activity and it levied fines—particularly if the law was flaunted.\footnote{8}

Two-stage conciliation, a mandatory statutory precedent to lawful strike action, was the primary mode of third party intervention into contract disputes in British Columbia from 1945 through 1972. A conciliation officer intervened during the first stage, while a conciliation board intervened during the second stage of the compulsory conciliation procedures. The conciliation officer typically used accommodative intervention: mediation. By contrast, the conciliation board used normative (or adjudicative) intervention: fact-finding and proposing a contract settlement.\footnote{9}

\footnote{7}{See Labour Relations Amendment Act, 1963, S.B.C. 1963, c. 20, s. 3 and see Appendix B, 230-231.}

\footnote{8}{See, for instance, Weiler, 1977, 66-71, and Carter, 1976, 7.}

\footnote{9}{The terms, "accommodative" and "normative" third-party intervention were defined above. They are defined and discussed in greater depth in Appendix A, as well.}
(See Woods, 1973, 157-159.) The procedures for compulsory two-stage conciliation varied over the 1945-72 time period.

During the first decade, *ad hoc* conciliation boards were set up practically automatically, and the boards generally issued proposed settlements to the parties. However, the virtual certainty that a board would be established often caused the parties to bargain very little in anticipation of a board award. If management and labour expected that the boards would split-the-difference, they would make exaggerated offers and few concessions during negotiations. Whenever bargainers tenaciously held back concessions so that a conciliation board would be established, they blunted the conciliation officer's role of promoting concessionary behaviour at the bargaining table, for the conciliation officer's main tool is persuasion. Conciliation board reports were forwarded automatically to the parties. Sometimes the settlements proposed in conciliation board reports formed the basis for settlement. By contrast, when one side or both sides rejected these proposed settlements, conciliation board reports may have had the effect of prolonging industrial disputes, since the proposed settlements established targets which both sides sought to improve upon.

The compulsory two-stage conciliation procedures were modified in 1954, in order to provide the conciliation officer with more power for effecting a settlement. Conciliation officers were to recommend to the minister of labour whether or not conciliation boards should be established. The minister of labour
could exercise his discretion in establishing conciliation boards and in forwarding conciliation reports to the parties. Thus, the establishment of a conciliation board and the issuance of conciliation reports became less certain than before. Moreover, the conciliation officer could use the threat not to recommend the establishment of a conciliation board, to induce labour and management to make concessions. If a conciliation board were not established, the parties could reach the deadline for a lawful strike or lockout very soon after the conciliation officer completed his appointment. The two-stage conciliation procedures gradually were transformed through this modification. It became less certain over time that conciliation would involve both stages, as conciliation boards fell into disuse during the 1950s and particularly during the 1960s in British Columbia.

In 1968 a permanent tribunal was established to replace the ad hoc conciliation boards as the second stage of the conciliation process. In addition, the conciliation process became voluntary. In other words, labour or management could unilaterally request that they be assigned a mediation officer (as conciliation officers became known). The minister of labour, however, could order that a mediation officer be appointed if he deemed it in the public interest. But the minister did so only rarely. Following mediation the permanent


11 The threat of the strike and statutory deadline procedures for collective bargaining, make collective bargaining work. The strike or strike threat can be particularly effective in generating concessionary behaviour at the bargaining table since strike action imposes costs on both labour and management.

12 See, for example, Woods, 1973, and Jamieson, 1968, 384-85.
tribunal adjudicated the dispute, handing down a proposed settlement. The proposed settlement was not binding, unless the parties agreed to be bound by it or the cabinet ordered that they be bound by it because it was in the public interest to do so. The route of mediation officer-tribunal adjudication was the only procedure for third-party intervention into contract disputes that the relevant statute spelled out. (See Herbert (1968) and Appendix B, 233-236.)

The permanence of the tribunal, the controversy that surrounded the establishment of the tribunal and controversial features of its initial decisions were several of the factors that lead to the tribunal's losing credibility before the public and to its being boycotted by organized labour in British Columbia. Moreover, the Government of British Columbia by-passed the tribunal to resolve several contract disputes which it considered to involve a high degree of public interest. For instance, it appointed special mediators to resolve several interest disputes in the forest products industry (see Jamieson, 1975, 129.)

Thus, to the extent that the tribunal was boycotted and by-passed, the conciliation procedures amounted to voluntary mediation from 1968 through 1972.

The general labour relations laws of British Columbia prescribed voluntary mediation as the primary method for resolving pre-strike contract disputes from the end of 1972 through 1975.
However, the minister of labour could order that the parties to a interest dispute submit to mediation.\(^{13}\) In addition, the Government of British Columbia frequently established vehicles for high-level mediation—industrial inquiry commissions—to resolve interest disputes involving a high degree of public interest during 1974 and 1975.\(^{14}\)

One of the statutory changes that took effect in British Columbia during the 1970s seemed to run counter to the general shift from compulsion to voluntarism. The Labour Code of British Columbia, which was enacted in 1973, called for first contract arbitration, if labour and management could not resolve their differences. (This was the first North American statute containing such a provision.)

First agreement arbitration was intended mainly as a remedial action against bargaining in "bad faith."\(^{15}\) The B.C. Labour Relations Board administered first contract arbitration. It was very reluctant to permit labour and management to shirk their bargaining responsibilities or to avoid economic warfare by permitting them to submit to their first contract dispute to

\(^{13}\) See Mediation Services Act, S.B.C. 1972 (2nd Sess.), c. 26, s. 11(2) and Labour Code of British Columbia, S.B.C. 1973 (2nd Sess.), c. 122, s. 69(2).


\(^{15}\) See, for example, Arthurs, 1975, 291-292 and Weiler, 1976, 77.
arbitration. Moreover, it attempted to induce labour and management to negotiate as much of their first agreement as possible.\textsuperscript{16}

Governments of British Columbia practised a modified version of the arsenal of weapons philosophy. This philosophy involves leaving many, if not all, modes of third-party intervention out of labour statutes and seldom invoking the weapons that were not included in labour statutes. It is intended to foster self-reliant dispute resolution between labour and management, since it should generate extreme uncertainty as to (1) whether or not third parties—including the government—will intervene into industrial disputes and (2) what kind of third-party intervention there will be (if any at all). As was the practice in other Canadian jurisdictions, Governments of British Columbia practiced this philosophy with respect to such things as "departmental mediation" (i.e., mediation by labour department officials), seizure, trusteeship and back-to-work legislation. The latter were not included in labour statutes; they were invoked on an ad hoc basis; and they were seldom invoked.

Governments of British Columbia modified the arsenal of weapons philosophy, to the extent that labour statutes of British Columbia provided for and encouraged conventional mediation of interest

disputes and, moreover, to the extent that they provided for forms of high level mediation, such as industrial inquiry commissions, as explained above. Governments of British Columbia also established a machinery of third-party intervention for resolving wildcat strikes, and towards the end of 1945-75 they provided for first contract arbitration, as explained above. Such modifications of the arsenal of weapons theory seem to reflect the fact that Canadian governments, including Governments of British Columbia, traditionally have been more inclined to provide for statutory modes of intervention into industrial disputes than have, for example, their American counterparts.

3.2 Strike Activity in British Columbia 1945-75

Strike data were gathered from various publications by the B.C. Department of Labour and from the files of a similar public agency which chose to remain anonymous. Inconsistencies were resolved by adopting the latter's data. Qualitative information concerning strike activity was gleaned from strike files, many of which contained newspaper clippings about disputes. Using these files, the data were classified according to contract status and jurisdiction, among other things. (See Appendix C, 245.)
The jurisdictional classifications for the strike data were as follows: federal private sector, federal public sector, fishing, and the Government of British Columbia's jurisdiction (both private and public sectors). The federal private sector jurisdiction embraces international and interprovincial transportation and communications, the nation's chartered banks, federal crown corporations, and businesses which Parliament deemed important to two or more provinces. As such, it includes certain segments of industry in British Columbia such as transportation which exert a significant influence on B.C.'s resource extraction based economy. For instance, a 1969 tow-boat dispute brought the Province's forest products industries to a virtually complete halt, imparting significant downward multiplier-effect to the economy of British Columbia. The federal public sector comprises those federal public servants who bargain collectively under the Public Service Staff Relations Act (R.S.C. 1970, c. P-35).

Fishing normally is not considered a jurisdiction, but, as it currently stands, fishing technically is neither part of the federal jurisdiction nor a part of the jurisdiction of the Government of British Columbia. Fishing had been considered a part of the federal private sector jurisdiction until 1974, when the Supreme Court of Canada ruled that fishing was outside (ultra vires) the federal jurisdiction under the British North American Act. The Supreme Court was supposed to hand down another decision con-

\footnote{See Canada Labour Code, Revised Statutes of Canada, 1970, c. L-1, S.2.}

\footnote{See Employers' Council of British Columbia (1970).}
cerning the jurisdiction for fishing sometime during the Fall of 1977. Because it was not clear whether the Federal Government of Canada or the Provincial Government of British Columbia will be regulating industrial relations in fishing in future, fishing was considered a separate jurisdiction.

The Government of British Columbia regulates labour relations between those employees and employers who lie outside fishing and the two federal jurisdictions. Strike data were gathered for all four jurisdictions in British Columbia for comparative purposes.

Within the jurisdiction of British Columbia the distribution of strikes by contract status was as follows for the years, 1945-75: first agreement--12%, contract renewal--52% and during the term--36%. (See Table 1.) Data concerning the ratios of first agreement strikes and of contract renewal strikes to all strikes generally are not available for Canada's other provincial jurisdictions. However, figures that were compiled from a study of injunctions and strikes in Ontario for the 1958-65 time period yielded similar results: first agreement--26% (331 strikes), contract renewal--45% (572 strikes) and during the term 29% (364 strikes).

Moreover, the 1955-65 figures for British Columbia were as follows: first agreement--21.5% (47 strikes), contract renewal--

---

\(^{19}\) See Carrothers and Palmer's 1966, 234, Table 40. Strikes which involved "other circumstances" were dropped from Carrothers and Palmer's data, in order to make that data compatible with the data used in the current study.
## Table 1

Number and Average Duration of Strikes Classified by Contract Status and By Jurisdiction in British Columbia: 1945-75

<table>
<thead>
<tr>
<th>JURISDICTION</th>
<th>CONTRACT STATUS</th>
<th>1945-49</th>
<th>1950-59</th>
<th>1960-69</th>
<th>1970-75</th>
<th>1945-75 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First Contract</td>
<td>Renewal</td>
<td>During Term</td>
<td>Other***</td>
<td>Either First Contract or Renewal</td>
<td>Presumably During Term</td>
</tr>
<tr>
<td></td>
<td>Years</td>
<td>No.</td>
<td>Average Duration</td>
<td>No.</td>
<td>Average Duration</td>
<td>No.</td>
</tr>
<tr>
<td>British Columbia</td>
<td>1945-49</td>
<td>12</td>
<td>36.08</td>
<td>41</td>
<td>30.17</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>1950-59</td>
<td>29</td>
<td>33.41</td>
<td>158</td>
<td>27.86</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>1960-69</td>
<td>59</td>
<td>84.95</td>
<td>205</td>
<td>43.71</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>1970-75</td>
<td>63</td>
<td>73.37</td>
<td>330</td>
<td>41.14</td>
<td>246</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>163</td>
<td>67.71</td>
<td>734</td>
<td>38.38</td>
<td>503</td>
</tr>
<tr>
<td>Federal: Private Sector</td>
<td>1945-49</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>17.50</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1950-59</td>
<td>0</td>
<td>0.0</td>
<td>15</td>
<td>20.93</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>1960-69</td>
<td>0</td>
<td>0.0</td>
<td>18</td>
<td>25.78</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>1970-75</td>
<td>3</td>
<td>48.67</td>
<td>41</td>
<td>13.32</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3</td>
<td>48.67</td>
<td>76</td>
<td>17.88</td>
<td>45</td>
</tr>
<tr>
<td>Federal: Public Sector</td>
<td>1960-69*</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1970-75</td>
<td>0</td>
<td>0.0</td>
<td>14</td>
<td>9.79</td>
<td>6</td>
</tr>
<tr>
<td>Fishing**</td>
<td>1945-49</td>
<td>2</td>
<td>15.00</td>
<td>1</td>
<td>6.00</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1950-59</td>
<td>0</td>
<td>0.0</td>
<td>10</td>
<td>32.20</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1960-69</td>
<td>1</td>
<td>101.00</td>
<td>1</td>
<td>4.00</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1970-75</td>
<td>1</td>
<td>12.00</td>
<td>3</td>
<td>16.33</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4</td>
<td>35.75</td>
<td>15</td>
<td>25.40</td>
<td>1</td>
</tr>
</tbody>
</table>

*Not permitted to bargain collectively until 1967, when the Public Service Staff Relations Act (PSSRA) was enacted.

** Not clear whether a part of the provincial jurisdiction or of the federal jurisdiction.

*** Includes strikes by unorganized employees and involves strikes by organized but non-certified government employees.
52.24% (114 strikes) and during the term 26.6% (58 strikes). British
Columbia and Ontario, therefore, appear to have experienced very
similar distributions of strikes by contract status during the 1958-65
time period.

By contrast, the patterns for the proportion of all strikes
that were wildcat strikes in British Columbia and Ontario diverged
1966 through 1972. According to Clack, strikes during the term
generally declined as a percentage of all strikes in Ontario (1975,
Figure VI). They dipped from roughly 26% during 1965-69 to
approximately 22% during 1970-72. By contrast, strikes during
the term increased substantially in British Columbia as a proportion
of all strikes from 34.3% during 1965-69, to 39% during 1970-72.20

The trend of strike activity in British Columbia was an
increasing one during the 1940s, 1950s, 1960s, and particularly
the 1970s, as is illustrated in Table 1. This increasing trend
occurred in the two jurisdictions that the Federal Government
regulates, as well. (See Table 1.) Moreover, Ontario and Quebec
also experienced a steady increase in strike activity, measured in
man-days lost, over the 1945-49, 1950-59, 1960-69, and 1970-75 time

20 Clack used five-year moving averages in his calculations. Five-year moving averages were calculated using the data presented in Table 2. They were as follows: 32.3% (1965), 39.9% (1966), 33.2% (1967), 29.7% (1968), 36.6% (1969), 35.8% (1970), 40.2% (1971), and 41% (1972). These percentages are very close to the ones that Clack presents for British Columbia for the corresponding years (1975, Figure VI).
However, when the strike data for British Columbia are classified according to contract status and aggregated over each year, a distinctly cyclical pattern is evident for each strike series from 1945 through 1971. The number of first agreement strikes, contract renewal strikes and strikes during the term generally increase during upswings and attain maximums either during the peak of each boom (e.g., 1951, 1956-57, and 1966) or within a year or two after the peak. They typically decline as the economy of British Columbia enters into a recessionary period and attain a minimum either during the trough of the regional business cycle (e.g., 1954, 1960-61, and 1970-71) or a year or two thereafter. By contrast, the advent of double-digit inflation, coupled with relatively high levels of unemployment from 1973 through 1975 generally was accompanied by an upsurge in the number of strikes for each of the three by strike series. (See Table 2.) But, such a cyclical pattern was not observed with regard to the durations of strikes. (See Table 2.)

Walsh also found that the duration of strikes was related much less to cyclical activity than was the number of strikes (1975, 47-48). Walsh, however, used national data concerning strikes in Canada and did not classify strikes by contract status.

---

21 See Jamieson (1977b) concerning strike activity, measured in man-days lost, for British Columbia, Ontario and Quebec from 1965 through 1974. See Garner (1977) concerning Canada-wide strike activity which has been classified by province (and industry) and which is measured as number of strikes per unionized employee and as man-days lost per unionized employee. See Eaton (1973) concerning man-days lost and the number of strikes in British Columbia and Ontario from 1946 through 1970. See also Canada Department of Labour, Strikes and Lockouts in Canada, which is an annual publication and which is the source for the data in the studies by Jamieson (1977b), Garner (1977) and Eaton (1973).
<table>
<thead>
<tr>
<th>Year</th>
<th>First Agreement</th>
<th>Renewal</th>
<th>During Term</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Duration (Working Days)</td>
<td>Average Duration (Working Days)</td>
<td>Average Duration (Working Days)</td>
</tr>
<tr>
<td></td>
<td>Number</td>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>1945</td>
<td>1</td>
<td>45.0000</td>
<td>3</td>
</tr>
<tr>
<td>1946</td>
<td>4</td>
<td>11.0000</td>
<td>6</td>
</tr>
<tr>
<td>1947</td>
<td>5</td>
<td>17.1667</td>
<td>17</td>
</tr>
<tr>
<td>1948</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
</tr>
<tr>
<td>1949</td>
<td>2</td>
<td>126.5000</td>
<td>5</td>
</tr>
<tr>
<td>1950</td>
<td>2</td>
<td>22.5000</td>
<td>8</td>
</tr>
<tr>
<td>1952</td>
<td>1</td>
<td>30.0000</td>
<td>19</td>
</tr>
<tr>
<td>1953</td>
<td>3</td>
<td>39.0000</td>
<td>16</td>
</tr>
<tr>
<td>1954</td>
<td>0</td>
<td>0.0</td>
<td>11</td>
</tr>
<tr>
<td>1955</td>
<td>C</td>
<td>0.0</td>
<td>7</td>
</tr>
<tr>
<td>1956</td>
<td>2</td>
<td>25.5000</td>
<td>11</td>
</tr>
<tr>
<td>1957</td>
<td>3</td>
<td>75.6667</td>
<td>25</td>
</tr>
<tr>
<td>1958</td>
<td>4</td>
<td>31.2500</td>
<td>16</td>
</tr>
<tr>
<td>1959</td>
<td>7</td>
<td>43.7143</td>
<td>19</td>
</tr>
<tr>
<td>1960</td>
<td>4</td>
<td>24.5000</td>
<td>7</td>
</tr>
<tr>
<td>1961</td>
<td>1</td>
<td>10.0000</td>
<td>11</td>
</tr>
<tr>
<td>1963</td>
<td>3</td>
<td>40.0000</td>
<td>8</td>
</tr>
<tr>
<td>1964</td>
<td>7</td>
<td>125.5714</td>
<td>14</td>
</tr>
<tr>
<td>1965</td>
<td>11</td>
<td>67.6364</td>
<td>26</td>
</tr>
<tr>
<td>1966</td>
<td>5</td>
<td>113.0000</td>
<td>17</td>
</tr>
</tbody>
</table>
Table 2 (continued)

<table>
<thead>
<tr>
<th>Year</th>
<th>First Agreement</th>
<th></th>
<th>Renewal</th>
<th></th>
<th>During Term</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Average Duration (Working Days)</td>
<td>Number</td>
<td>Average Duration (Working Days)</td>
<td>Number</td>
<td>Average Duration (Working Days)</td>
</tr>
<tr>
<td>1967</td>
<td>7</td>
<td>31.4286</td>
<td>28</td>
<td>46.3929</td>
<td>23</td>
<td>6.6957</td>
</tr>
<tr>
<td>1968</td>
<td>7</td>
<td>51.4286</td>
<td>38</td>
<td>37.3421</td>
<td>21</td>
<td>11.0000</td>
</tr>
<tr>
<td>1969</td>
<td>9</td>
<td>121.1111</td>
<td>47</td>
<td>32.4808</td>
<td>28</td>
<td>3.9655</td>
</tr>
<tr>
<td>1970</td>
<td>13</td>
<td>117.6154</td>
<td>44</td>
<td>43.1875</td>
<td>8</td>
<td>7.1111</td>
</tr>
<tr>
<td>1971</td>
<td>14</td>
<td>67.3571</td>
<td>29</td>
<td>37.5455</td>
<td>56</td>
<td>5.0847</td>
</tr>
<tr>
<td>1972</td>
<td>9</td>
<td>30.6667</td>
<td>46</td>
<td>31.5636</td>
<td>30</td>
<td>7.1143</td>
</tr>
<tr>
<td>1973</td>
<td>8</td>
<td>60.4444</td>
<td>59</td>
<td>35.1765</td>
<td>65</td>
<td>3.7200</td>
</tr>
<tr>
<td>1974</td>
<td>17</td>
<td>70.8235</td>
<td>65</td>
<td>32.7121</td>
<td>52</td>
<td>5.5714</td>
</tr>
<tr>
<td>1975</td>
<td>11</td>
<td>58.9167</td>
<td>98</td>
<td>36.8273</td>
<td>33</td>
<td>9.1500</td>
</tr>
<tr>
<td></td>
<td>175</td>
<td>737</td>
<td>497</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Stuart Jamieson, attributes the cyclical pattern of strikes in British Columbia (and elsewhere in Canada) to "... economic instability, particularly as regards highly unstable cycles of investment and construction activity (1977a, 1)." He points out that large, "lumpy" changes in investment activity and in turn in construction activity—some of which were associated with the Provincial Government's expenditures on major public undertakings, such as dams—have fuelled the cyclical regional economy of British Columbia. The dependence of British Columbia's resource-based economy upon the vagaries of foreign markets for a considerable proportion of their sales has accentuated the instability and the cyclical-proneness of the regional economy of British Columbia.

Professor Jamieson focuses much of his analysis of strike activity in British Columbia on the two "pattern setting" industries, construction and forest products. (See Jamieson, 1977b.) Between them, forest products and construction accounted for over one-quarter of all strikes that issued from interest disputes and for almost three-quarters of all strikes during the term in British Columbia from 1945 through 1975. (See Table 3.)

Other features of the industrial composition of the three strike series are noteworthy, too. Service and trade for instance, accounted for approximately forty-one percent of all first agreement strikes, but they only contributed eighteen percent of the contract renewal strikes and 2.4% of the strikes during the term. (See Table 3.)
### TABLE 3

The Percentage of Strikes Within the Jurisdiction of British Columbia by Industry: 1945-75

<table>
<thead>
<tr>
<th>Industry</th>
<th>First Agreement (%)</th>
<th>Contract Renewal (%)</th>
<th>During Term (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINING</td>
<td>4</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>MANUFACTURING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food &amp; Beverages</td>
<td>4</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Pulp, etc.*</td>
<td>6</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>Logging, etc.**</td>
<td>1</td>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td>Wood Products**</td>
<td>8</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>FOREST PRODUCTS</td>
<td>15</td>
<td>16</td>
<td>56</td>
</tr>
<tr>
<td>Metal Products</td>
<td>5</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Machinery†</td>
<td>5</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Misc. Manu.</td>
<td>11</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>Sub Total</td>
<td>40</td>
<td>47</td>
<td>68</td>
</tr>
<tr>
<td>CONSTRUCTION</td>
<td>11</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>TRANSPORTATION, COMMS.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilities</td>
<td>4</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>TRADE</td>
<td>24</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>SERVICES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Misc. Services</td>
<td>10</td>
<td>7</td>
<td>.4</td>
</tr>
<tr>
<td>Sub Total</td>
<td>17</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total Number</strong></td>
<td>163</td>
<td>734</td>
<td>503</td>
</tr>
</tbody>
</table>

* Primarily pulp and paper: 1945-69; includes wood products: 1970-75.

** Covers 1945-69.

*** Includes pulp, etc.; logging, etc.; and wood products.

† Includes heavy electrical and transportation machinery.
The relatively high percentage of first agreement strikes and the relatively low percentage of strikes during the term reflect the fact that both services and trade traditionally were difficult to organize and that it was difficult to retain a union once it was certified in either the services or trade.

3.3 Strike-Related Issues and Data

Three strike-related issues will be dealt within this section.

1. Are there statistical differences among the three series of strikes that would seem to warrant their being dealt with separately, as opposed to jointly? Pairwise statistical tests were conducted with respect to the differences between the mean number and the mean duration of the three strike series. Pairwise correlation coefficients were calculated in order to determine the degree to which the three series were colinear. The mean of the difference between the two variables generally was significantly different from zero at a very high level of significance, and the correlation coefficients were not high enough (a minimum of .8 and preferably .9) to warrant lumping the series together, say, in the regression analysis that follows below.  

---

22The results of the test, that the mean of the difference between the two variables was zero, were as follows: (continued on following page)
2. What was the extent of unlawful strike activity in British Columbia? The bulk of unlawful strikes that took place in British Columbia from 1945 through 1975 were, of course, strikes during the term or so-called unlawful strikes (see Table 1).

By contrast, somewhat less than eight percent of all strikes that issued from interest disputes were unlawful strikes. (See Table 4.) The large proportion of results that were "not reported" seemingly casts doubt as to the accuracy of these results. Indeed, to the extent that results which were classed as "not reported" included unlawful strike activity, we have underestimated the proportion of contract negotiations strikes that were unlawful. However, these estimates are accurate to the extent that the press reported "news-worthy" strike behaviour, focusing on unlawful strike action. Moreover, the fact that similar results obtained in the federal jurisdiction (see Table 5), seems to support the conclusion that the estimates for British Columbia are fairly accurate.

\[
\begin{align*}
T_{NS_2,NS_1} &= 5.473^* \\
T_{NS_3,NS_1} &= 4.296^* \\
T_{NS_2,NS_3} &= 2.82^* \\
T_{DUR_1,DUR_2} &= 1.7877^{**} \\
T_{DUR_1,DUR_3} &= 5.5950^{*} \\
T_{DUR_2,DUR_3} &= 9.8021^{*}
\end{align*}
\]

where NS and DUR represent the number of strikes and duration and where 1, 2, and 3 represent first agreement, contract renewal and during the term, respectively. All t-statistics (T) are statistically

(continued on page 102)
<table>
<thead>
<tr>
<th>Legal Status</th>
<th>First Agreement</th>
<th>Contract Renewal</th>
<th>During Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely legal</td>
<td>21 (12%)</td>
<td>181 (25%)</td>
<td>-</td>
</tr>
<tr>
<td>Apparently legal</td>
<td>1 (1%)</td>
<td>18 (2%)</td>
<td>-</td>
</tr>
<tr>
<td>Illegal: during the term of the contract</td>
<td>-</td>
<td>*</td>
<td>438 (100%)</td>
</tr>
<tr>
<td>Illegal: &quot;jumped the gun&quot;**</td>
<td>5 (3%)</td>
<td>35 (5%)</td>
<td>-</td>
</tr>
<tr>
<td>Possibly illegal: for various reasons***</td>
<td>9 (5%)</td>
<td>18 (2%)</td>
<td>-</td>
</tr>
<tr>
<td>Not recorded</td>
<td>138 (79%)†</td>
<td>485 (66%)†</td>
<td>-</td>
</tr>
<tr>
<td>**Total</td>
<td>174</td>
<td>737</td>
<td>438</td>
</tr>
</tbody>
</table>

* A few of the first agreement and contract renewal strikes violated the precondition for a lawful strike that the contract must have expired, but they are listed under the category of "illegal: 'jumped the gun'."

** "Illegal: 'jumped the gun'" means that at least one of the preconditions for a lawful strike was violated. For instance, a secret strike vote may not have been held prior to the work stopped.

*** Includes "booking off sick," respecting another union's picket lines, "information pickets," "mystery pickets," and picket sign saying "no contract, no work."

† The data are based upon newspaper articles, and the press is apt to sensationalize such things as unlawful strike action. Thus, we might expect that most, if not nearly all the responses that were "not recorded" involved lawful strike action.
TABLE 5
The Legality of Strikes Disaggregated by Contract Status within the Federal Government's Jurisdictions in British Columbia: 1945-75

<table>
<thead>
<tr>
<th>Legal Status</th>
<th>First Agreement</th>
<th>Contract Renewal</th>
<th>During Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely Legal</td>
<td>0</td>
<td>6 (7%)</td>
<td>-</td>
</tr>
<tr>
<td>Apparently legal</td>
<td>0</td>
<td>4 (5%)</td>
<td>-</td>
</tr>
<tr>
<td>Illegal: during the term of the contract</td>
<td>*</td>
<td>*</td>
<td>52 (100%)</td>
</tr>
<tr>
<td>Illegal: &quot;jumped the gun&quot;**</td>
<td>0</td>
<td>7 (8%)</td>
<td>-</td>
</tr>
<tr>
<td>Possibly illegal: for various reasons***</td>
<td>0</td>
<td>4 (5%)</td>
<td>-</td>
</tr>
<tr>
<td>Not recorded</td>
<td>1 (100%)</td>
<td>65 (75%)</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>86</td>
<td>52</td>
</tr>
</tbody>
</table>

* A few of the first agreement and contract renewal strikes violated the precondition for a lawful strike that the contract must have expired, but they are listed under the category of "illegal: 'jumped the gun.'"

** Illegal: 'jumped the gun'" means that at least one of the preconditions for a lawful strike was violated. For instance, a secret strike vote may not have been held prior to the work stopped.

*** Includes "booking off sick," respecting another union's picket lines, "information pickets," "mystery pickets," and picket sign saying "no contract, no work."

† The author is quite certain that nearly all of the strikes whose legal status was not recorded were lawful strikes.
3. How were strikes ended? How often were strike-ending measures used and, in particular, how often did governments of British Columbia use strike-ending weapons from the arsenal of weapons philosophy? What kind of an impact did strike-ending measures seem to have had on the average duration of strike activity? What modes of third party intervention most often were associated with strike-ending settlements? How often were accommodative versus normative modes of third-party intervention associated with strike-ending settlements?

Some 6.4 percent of all strikes in British Columbia were resolved through legal measures. (See Table 6.) Approximately 5.2 percent of strikes in British Columbia during 1945-75 involved strike-ending legislation (2.3%) or the issuance of partial or full injunctions (2.9%), while only six of over 1,400 industrial disputes were curtailed through trusteeship or seizure. (See Table 6.) Thus, governments of British Columbia rarely invoked the strike ending weapons that are to be deployed as a part of the arsenal of weapons philosophy: trusteeship, seizure and back-to-work legislation. Moreover, strike-ending measures tend to have exerted different from zero at the .1% level (*) but one. The one exception is statistically different from zero at the 10% level(**).

The result of the correlation tests were the following:

\[ r_{NS_1,NS_2} = .7134 \quad r_{NS_1,NS_3} = .6284 \quad r_{NS_2,NS_3} = .7011 \]
\[ r_{DUR_1,DUR_2} = -.0585 \quad r_{DUR_1,DUR_3} = 0.2478 \quad r_{DUR_2,DUR_3} = .1768 \]

here \( r \) is the correlation coefficient.
<table>
<thead>
<tr>
<th>LEGAL MEASURES</th>
<th>British Columbia</th>
<th>Federal: Public Service</th>
<th>Federal: Private Sector</th>
<th>Fishing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back-to-work legislation</td>
<td>20</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>Back-to-work order by labour</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Relations Board</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government declared mediator's</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>award binding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back-to-work legislation threatened</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Partial injunction</td>
<td>22</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Full injunction</td>
<td>18</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>Injunction denied or reserved</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Union or firm placed under</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>government administration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>88</strong></td>
<td><strong>0</strong></td>
<td><strong>17</strong></td>
<td><strong>2</strong></td>
<td><strong>107</strong></td>
</tr>
<tr>
<td><strong>No Record</strong></td>
<td><strong>1376</strong></td>
<td><strong>22</strong></td>
<td><strong>108</strong></td>
<td><strong>21</strong></td>
<td><strong>1527</strong></td>
</tr>
</tbody>
</table>

a rather small impact in reducing the average duration of strikes in British Columbia during 1945-75 from what it would have been in their absence.

Interest dispute strikes most often were resolved through negotiations, while strikes during the term most often were resolved through arbitration (as a part of the grievance machinery) and negotiations. (See Table 7.) Predictably, accommodative modes of dispute resolution (i.e., mediation, high-level mediation and industrial inquiry commissions) were used more often than normative modes to resolve interest dispute strikes. Moreover, normative (or adjudicative) modes—namely arbitration—were used more frequently than accommodative modes to resolve strikes during the term. (See Table 7.)

Two of the three main findings presented above suggest that we focus on strikes during the term in this study. First, strikes during the term make up the bulk of unlawful strikes. Second, statistical evidence was adduced, that first agreement strikes, contract renewal strikes and strikes during the term are different kinds of strikes and, therefore, should be studied separately.

Another reason for focusing on wildcat strikes is that they occur under different circumstances, and presumably for different reasons, than do interest dispute strikes. For instance, the contract is "closed" rather than "open." Moreover, wildcat
TABLE 7
The Modes of Dispute Resolution Employed During Strike Action Classified by Contract Status Within British Columbia's Jurisdiction: 1945-75

<table>
<thead>
<tr>
<th>Modes of Dispute Resolution</th>
<th>Contract Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First Agreement</td>
</tr>
<tr>
<td>Negotiations</td>
<td>37 (21%)</td>
</tr>
<tr>
<td>Mediation*</td>
<td>18 (10%)</td>
</tr>
<tr>
<td>Departmental Mediation**</td>
<td>4 (2%)</td>
</tr>
<tr>
<td>Industrial Inquiry Commission</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Arbitration</td>
<td>5 (3%)</td>
</tr>
<tr>
<td>Union Abandoned Strike</td>
<td>8 (5%)</td>
</tr>
<tr>
<td>Employment Conditions Stated No Longer Affected (strikers replaced)</td>
<td>6 (3%)</td>
</tr>
<tr>
<td>Operations Reported Closed</td>
<td>2 (1%)</td>
</tr>
<tr>
<td>No Record</td>
<td>94 (54%)</td>
</tr>
</tbody>
</table>

Total 175 737 498

* Includes mediation by mutually selected private mediators.
** Mediation by labour department administrators and officials.
*** Less emphasis was placed on gathering the information concerning dispute resolution for strikes during the term than for either contract renewal strikes or first agreement strikes.
strike activity represents a circumvention of the grievance machinery. The statutes of British Columbia (and nearly all other Canadian jurisdictions) set out the grievance machinery, which typically culminates in binding arbitration, as a compulsory method for resolving rights disputes.

3.4 Wildcat Strikes in British Columbia: 1945-75

Thirty-six percent of all strikes in British Columbia were wildcat strikes. This was one of the highest ratios of wildcat strikes to all strikes in Canada. In both Canada and the United States thirty percent of all strikes were wildcat strikes over the 1945-72 time period. Moreover, Nova Scotia, where approximately one-half of all strikes were wildcat strikes over the same period, had the highest incidence of "unlawful" strikes. British Columbia only experienced two years, 1971 and 1973, when approximately one-half of all strikes were "illegal" strikes.

British Columbia's above-average incidence of "unauthorized" strikes presumably is mainly due to its resource-based economy, which is composed of traditionally wildcat-prone industries, such as mining, forest products, construction, and

---

23 See Clack, 1975, 6-7, and 10-11. See Jamieson, 1962, for an analysis of the 1949-59 wildcat strike experience in British Columbia, as compared with the rest of Canada.

24 The ratio of wildcat strikes to all strikes exceeded one-half in 1971, it was slightly under one-half in 1973. (See Table 9 below.)
transportation. Curiously, the high incidence of "protest" strikes in Nova Scotia is seemingly inexplicable. (See Clack, 1975, 11 and 15.)

There was a substantial increase in wildcat strikes in British Columbia from 1965-69 to 1970-72, as described above.26 The upswing in the ratio of unauthorized strikes to all strikes that occurred in British Columbia was not paralleled elsewhere in Canada. In particular, it was not paralleled in Quebec, Ontario and Nova Scotia, which along with British Columbia generally have contributed about ninety percent of the wildcat strikes in Canada. Clack discovered that during 1965-69 as compared with 1970-72 the proportions of wildcat strikes to all strikes declined in Ontario from roughly twenty-six percent to approximately twenty-two percent, in Quebec from about nineteen percent to below ten percent in Nova Scotia from somewhat above sixty percent to somewhat below fifty percent (1975, Figure VI).

The increasing trend of wildcat strikes activity in British Columbia seems to have mirrored a deterioration of labour relations in the forest products industries. During the peak wildcat strike years of 1971 and 1973, for instance, wildcat strikes in these industries made up at least sixty-nine percent


26 See p. 92 above.
of all wildcat strikes. (See Table 8.) Significantly, the years 1971 and 1973 included the middle portion of collective agreements in these industries. In particular, they included the one-quarter mark to the three-quarters mark of the two year master agreements that were negotiated in mid-1970 and mid-1972. At least one of these strikes, a strike by fallers during 1971 was in protest of the remuneration the fallers, a particular "informal work group," earned within the framework of each of the three master agreements covering logging. It is also noteworthy that reportedly the executive of the International Woodworkers of America and the employers associations in the forest products industries jointly undertook to reduce the incidence of wildcat strikes during 1974 and especially during 1975. They enjoyed considerable success in the undertaking in 1975 in particular. (See Table 9.)

The second-highest wildcat-prone industry, construction, also contributed to the rash of wildcat strikes that took place in British Columbia during 1970-75. However, in comparison with forest products, the proportion of all strikes that were "unauthorized" strikes in construction was a more volatile series, of lower incidence. Finally, mining and food and beverages, both of which previously were rather "dormant" became more active contributors

---

27 The problem, that "informal work group" is dissatisfied with its remuneration, commonly occurs in a consolidated bargaining structure like the one in B.C.'s forest products industries. (See Weber, 1967, 14 and 18.)

28 See, for example, N.L. Menard, 3rd Vice President of Regional Council No. 1, International Woodworkers of America, personal letter in my possession, May 10, 1978.
### TABLE 8
The Pattern of Wildcat Strikes Within Selected Industries and Industrial Groupings in the Jurisdiction of British Columbia: 1960-75

<table>
<thead>
<tr>
<th>Year</th>
<th>Mining</th>
<th>Food &amp; Beverages</th>
<th>Pulp, etc.*</th>
<th>Logging, etc.</th>
<th>Wood Products</th>
<th>Misc. Manu.</th>
<th>Construction</th>
<th>Transportation</th>
<th>All Industries</th>
<th>% in Forest Products†</th>
<th>% in Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>25.0%</td>
<td>50.0%</td>
</tr>
<tr>
<td>1961</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>100.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>1962</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>100.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>1963</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>66.7%</td>
<td>33.3%</td>
</tr>
<tr>
<td>1964</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>9</td>
<td>33.3%</td>
<td>33.3%</td>
</tr>
<tr>
<td>1965</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>13</td>
<td>30.8%</td>
<td>38.5%</td>
</tr>
<tr>
<td>1966</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>11</td>
<td>45.5%</td>
<td>45.5%</td>
</tr>
<tr>
<td>1967</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td>23</td>
<td>43.4%</td>
<td>26.1%</td>
</tr>
<tr>
<td>1968</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>12</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>21</td>
<td>76.2%</td>
<td>23.8%</td>
</tr>
<tr>
<td>1969</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>13</td>
<td>8</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>28</td>
<td>82.1%</td>
<td>10.7%</td>
</tr>
<tr>
<td>1970</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>87.5%</td>
<td>0.0%</td>
</tr>
<tr>
<td>1971</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td>37</td>
<td>-</td>
<td>1</td>
<td>10</td>
<td>0</td>
<td>56</td>
<td>78.6%</td>
<td>17.9%</td>
</tr>
<tr>
<td>1972</td>
<td>4</td>
<td>0</td>
<td>9</td>
<td>7</td>
<td>-</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>30</td>
<td>53.3%</td>
<td>13.3%</td>
</tr>
<tr>
<td>1973</td>
<td>7</td>
<td>4</td>
<td>23</td>
<td>22</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>65</td>
<td>69.2%</td>
<td>1.5%</td>
</tr>
<tr>
<td>1974</td>
<td>7</td>
<td>6</td>
<td>23</td>
<td>6</td>
<td>-</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>52</td>
<td>55.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>1975</td>
<td>5</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>-</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td>33</td>
<td>36.3%</td>
<td>18.2%</td>
</tr>
</tbody>
</table>

29 15 83 110 34 15 48 5 371 61.2% 12.9%

*Primarily pulp and paper: 1945-69; includes wood products, 1970-75 (Standard Industrial Classification Codes are set out in Appendix D.)*

**Covers 1945-69.*

***Much of transportation lies within the federal private sector jurisdiction.*

†Forest products include pulp, etc., logging etc., and wood products.
<table>
<thead>
<tr>
<th>INDUSTRY</th>
<th>Wages</th>
<th>Comfort</th>
<th>Safety</th>
<th>Security</th>
<th>Deployment</th>
<th>Discipline</th>
<th>Scheduling</th>
<th>Union Movement</th>
<th>Jurisdiction</th>
<th>Contractual Matters</th>
<th>Miscellaneous</th>
<th>Row Total</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FISHING</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>MINING</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>9</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>42</td>
<td>11.0</td>
</tr>
<tr>
<td>MANUFACTURING:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food and Beverages</td>
<td>10</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
<td>15</td>
<td>3.0</td>
</tr>
<tr>
<td>Logging, etc.**</td>
<td>19</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>3</td>
<td>16</td>
<td>3</td>
<td>11</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>78</td>
<td>20.4</td>
</tr>
<tr>
<td>Wood products**</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>1</td>
<td>16</td>
<td>6</td>
<td>7</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>58</td>
<td>15.2</td>
</tr>
<tr>
<td>PULP, LOGGING, WOOD</td>
<td>33</td>
<td>9</td>
<td>13</td>
<td>16</td>
<td>6</td>
<td>43</td>
<td>13</td>
<td>27</td>
<td>6</td>
<td>11</td>
<td>13</td>
<td>193</td>
<td>50.5</td>
</tr>
<tr>
<td>MANUFACTURING:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metals</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>7</td>
<td>1.8</td>
</tr>
<tr>
<td>Machinery***</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>12</td>
<td>3.1</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>20</td>
<td>5.2</td>
</tr>
<tr>
<td>MANUFACTURING</td>
<td>44</td>
<td>9</td>
<td>15</td>
<td>21</td>
<td>6</td>
<td>50</td>
<td>16</td>
<td>41</td>
<td>11</td>
<td>16</td>
<td>15</td>
<td>247</td>
<td>64.6</td>
</tr>
<tr>
<td>CONSTRUCTION</td>
<td>12</td>
<td>5</td>
<td>6</td>
<td>0</td>
<td>2</td>
<td>12</td>
<td>0</td>
<td>10</td>
<td>21</td>
<td>3</td>
<td>5</td>
<td>76</td>
<td>20.0</td>
</tr>
<tr>
<td>TRANSPORTATION</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>9</td>
<td>2.4</td>
</tr>
<tr>
<td>COMMUNICATIONS</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>UTILITIES</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>TRADE</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0.8</td>
</tr>
<tr>
<td>SERVICES:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Municipal</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Provincial</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Federal</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>68</td>
<td>20</td>
<td>28</td>
<td>24</td>
<td>11</td>
<td>74</td>
<td>21</td>
<td>58</td>
<td>33</td>
<td>19</td>
<td>26</td>
<td>382</td>
<td></td>
</tr>
<tr>
<td>PERCENT (%)</td>
<td>17.8</td>
<td>5.2</td>
<td>7.3</td>
<td>6.3</td>
<td>2.9</td>
<td>19.4</td>
<td>5.5</td>
<td>15.2</td>
<td>8.6</td>
<td>5.0</td>
<td>6.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Primarily pulp and paper: 1945-1969; also covers wood products: 1970-75

** Covers: 1945-69

*** Includes heavy equipment, electrical and transportation machinery
to the 1970-75 upsurge of unlawful strikes in British Columbia.

Professor Jamieson (1962, 410-411) has argued that wildcat strike activity in British Columbia conformed with the theory of strike activity that Kerr and Siegal (1954) developed. According to Kerr and Siegel, workers who are isolated, say, in work camps or in company towns and who are engaged in hard physical labour share hardships, frustrations and experiences both on-and-off-the-job. By contrast, urban workers, who live far apart and who in particular share fewer off-the-job experiences with their co-workers, make up a less cohesive group than do the "isolated masses." Kerr and Siegal essentially assume that the more experiences and frustration employees share, the more likely they will "wildcat" when a potential wildcat strike-triggering incident takes place (cet. par.).

K-S, therefore, conclude that the "isolated masses" should be more prone to wildcat than are urban labourers. In other words, the K-S theory predicts that, because of social pressures, a larger proportion of rural bargaining units, as opposed to urban bargaining units, will wildcat. This prediction was not tested empirically for British Columbia. The K-S theory presumably also predicts that because the rural-urban composition of society changes so slowly, there will be little variation in wildcat strike activity from one year to the next (cet. par.). This prediction clearly did
not necessarily obtain for British Columbia data concerning wildcat strikes (see Table 2 above). Indeed, the strike cycle of British Columbia was related to the business cycle of British Columbia, as noted above.

Kerr and Siegal's empirical findings concerning the international interindustry propensity to strike resemble my findings for British Columbia. They found that construction, forest products, mining and longshoring, among other industries were relatively strike-prone industries. My findings are that, from 1945 through 1975, the most wildcat-prone industries in British Columbia included mining and transportation, as well as, of course, forest products and construction. (See Tables 9 and 10.) Longshoring is captured in the statistics for transportation which are classified within the federal jurisdiction (see Table 10). It is noteworthy that longshoring is an urban industry. Strictly speaking, the K-S theory would predicts that longshoring be a rural industry.

The Kerr and Siegal theory does not yield testable hypotheses concerning the causes of wildcat strikes. In particular, it does not explain how the various causes of wildcat strikes are related to shared experiences or shared frustrations and how they might vary from one industry to another. Rather, it mainly describes a kind of social bond that might induce a group of employees to withdraw their labour services collectively.

Some understanding of the causes of wildcat strikes can be derived from data concerning the reasons that employees stated
<table>
<thead>
<tr>
<th>INDUSTRY</th>
<th>Job Security</th>
<th>Deployment</th>
<th>Discipline</th>
<th>Scheduling</th>
<th>Union Movement</th>
<th>Jurisdiction</th>
<th>Contractual Matters</th>
<th>Miscellaneous</th>
<th>Safety</th>
<th>Wages</th>
<th>Comfort</th>
<th>Row Total</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>8</td>
<td>1</td>
<td></td>
<td>26</td>
<td>72.2</td>
</tr>
<tr>
<td>Communications</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>19.4</td>
</tr>
<tr>
<td>Services: Federal</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>84</td>
</tr>
<tr>
<td>Column Total</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>0</td>
<td>8</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>9</td>
<td>1</td>
<td></td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Percent (%)</td>
<td>8.3</td>
<td>11.1</td>
<td>19.5</td>
<td>0</td>
<td>22.2</td>
<td>8.3</td>
<td>2.8</td>
<td>0</td>
<td>25.0</td>
<td>2.8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
However there is a caveat: the reasons stated need not be the underlying cause. Discipline (19.4%), wages (17.84%), the union movement (15.2%), jurisdiction (8.6%), comfort (5.2%), and safety (7.3%) were among the reasons that employees most often cited for walking off during the terms of collective agreements. (See Table 9.) Predictably, safety disputes occurred primarily in forest products (46%), construction (21%) and mining (21%), while jurisdictional disputes took place in construction (64%), forest products (18%) and manufacturing other than forest products (15%). (See Table 9.) Transportation in the federal jurisdiction (e.g., dry docks, shipping and longshoring) accounted for eight percent (3/36) of all jurisdictional disputes in British Columbia.

Rees (1952) attempted to address what it is that causes or provokes employees to "hit the bricks" while a collective agreement is in force (or "closed"). He views the wildcat strike as a cathartic device indeed as a "pressure-valve" for releasing pent-up frustrations. As such, Rees' theory is not directly testable, since it obviously is very difficult to predict empirically when a person has reached his or her "frustration threshold." But, Rees links employees' tolerance limits for pent-up frustrations inversely with the degree of job security they enjoy. As the unemployment rate decreases (increases), the more (less) secure should employees'
jobs become and the greater (smaller) will be their chances of finding alternative employment during a strike. Hence, employees will become more (less) strike-prone. Moreover, the lower (higher) is the probability that the employer can hire strikebreakers.

The Rees' theory, however, fails to incorporate other factors that might induce an employee to wildcat. Let us suppose for instance a group of employees were locked into a multi-year contract which was concluded prior to an inflationary period. Suppose also that the employees felt that their wages were falling behind the wages that employees in their "orbit of comparison" were receiving, say, because the other employees' contracts were of shorter duration. Presumably, the greater the wage disparity or "catchup" that seems to be in order, the more prone the workers will be to protest the erosion of their economic standing vis-a-vis the other employees (or the standard of living they expect to maintain). What we have described includes the cost-of-living adjustment or COLA strike.30

There are at least two reasons for adding to Rees' theory the "COLA strike syndrome." First, COLA strikes have taken place in British Columbia. For example, there was an outbreak of COLA strikes during the first decade following the end of World War II. More recently, there were a number of COLA strikes during the double-digit inflation of the 1970s in British Columbia.31 Second,

30 This is not to say that Rees did not recognize that changes in the cost of living were a cause of strikes, for he did (1952, 382). However, Rees did not emphasize the relationship between changes in the cost of living and pent-up frustrations to the extent that it was emphasized above.

31 See Meadows (1974) and Meadows (1975).
what employees perceive to be an erosion of their wages, either relative to other employees or relative to the standard of living, presumably will increase their levels of frustration, causing them to hit their "frustration threshold" more quickly than otherwise.

The latter theory, the Rees-cum-economic-erosion theory of wildcat strikes, is the theory that will be used to test empirically the labour law-strike relationship in British Columbia.

3.5 Conclusion

Labour legislation evolved from stressing compulsion, litigation and punitive remedies towards stressing accommodation where adjudication was a last resort. The general trend, cyclical pattern and industrial distribution of strike activity was examined for each of the three classes of strikes: first agreement strikes, contract renewal strikes and strikes during the term. It was inferred statistically that the three strike series constituted different kinds of strikes. Hence they will be dealt with separately in the empirical study that follows. Data were presented concerning the frequency with which governments of British Columbia invoked strike-ending measures which were weapons from the arsenal of weapons theory.
Although there are some interest dispute strikes where employees "jump the gun" and walk off before they can lawfully strike, the preponderance of unlawful strikes in British Columbia were wildcat strikes. Partly for this reason, we analyzed the wildcat strike activity in British Columbia. A deterioration of labour relations in the forest products industry of British Columbia seems to have sustained the "wave" of unauthorized strikes that took place in British Columbia during 1970-75. Cost-of-living-adjustment of COLA strikes also took place at this time, particularly during 1974 and 1975, when double-digit inflation "fuelled" them. Of course, wage and price inflation may have precipitated and/or sustained the wave of protest strikes that took place in the forest products industries of British Columbia during 1970-75.

The Kerr and Siegal theory of wildcat strikes provides an explanation of a kind of social bond which influences, at the least, the proportion of the bargaining unit that walks off the job, *en masse*. Rees' "pressure-value" theory of "protest" strikes was modified to allow for erosions in employees economic standings. The latter theory will be applied to strike data to determine the effects of changes in labour legislation on strike activity in British Columbia. The empirical findings of the current study will be presented in Chapter 4.
CHAPTER 4

THE EFFECTS OF CHANGES IN LABOUR LEGISLATION ON STRIKE ACTIVITY IN BRITISH COLUMBIA: 1945-75

Labour relations experts and practitioners as well as members of the public have doubted the effectiveness of changes in legislation in reducing either the incidence or the duration of strike activity in Canada. However, their arguments amounted to assertions, since they lacked empirical substantiation. Several researchers, including Vanderkamp (1970), Smith (1972) and Walsh (1975) used regression analysis to investigate strike activity in Canada, but none of them tested for the effects of changes in legislation on strike activity.

Ashenfelter and Johnson (1969) employed regression analysis to test for the effects of the enactment of the Landrum-Griffin Act on strike activity in the United States. A-J reasoned that provisions in the Act promoting "union democracy" would generate rank-and-file militancy, which would manifest itself in an increase in strike activity. Their test consisted of comparing two regression estimates. One included, but the other excluded, an intercept dummy variable which remained "on" while the Landrum-Griffin Act (LG) was in force. A-J found that the LG modification

The other regressors included an indicator of the firm's ability to pay, the unemployment rate and measures of changes in employees' real wages, including the percentage change of the consumer price index.
was associated with a higher $R^2$ and that the coefficient of LG suggested "... a modest, but significant increase of about eighty-eight strikes per quarter over the pre-Landrum-Griffin period (1969, 47)."

The current theory applies the A-J methodology, but this study differs from A-J's in at least five ways. First, this study is regional, as opposed to national, in scope. Second, there are separate regressions for first agreement strikes, contract renewal strikes and strikes during the term, instead of one regression for all strikes. Third, not just one theory, but two theories of strike activity are used to motivate the economic variables used as regressions, as explained below. Fourth, a socio-economic variable, the average age of the non-agricultural workforce, is included among the regressors. Fifth, incidence measures of strike activity, which serve as regressants, are constructed from actual contract expiry data, rather than simulated with dummy variable schemas.

British Columbia was selected for this study because the level of strike activity in the province is one of the highest in Canada and because governments of British Columbia occasionally enacted novel, and at times, dramatic methods for regulating labour relations in the province. Accounting for over eleven percent of Canada's population, British Columbia

---

2Regional, as opposed to national, economic factors apparently exert a greater influence on collective bargaining, particularly strike activity. See, for example, the studies by Eaton (1973), Garner (1977) and Jamieson (1977b) which are explained above on page 10.
has accounted for about eleven percent of Canada's strike activity.\textsuperscript{2a} One of British Columbia's labour statutes, the Labour Code of British Columbia, which was enacted in 1973 and which is covered in the current study, was (and still is) considered the most innovative and progressive labour relations statute in North America.\textsuperscript{3}

### 4.1 The Regression Equations

Two theories suggest the regression equations to be estimated. One theory is the strike-as-an-investment theory of bargaining that was presented in Chapter 2; the other is the theory of wildcat strikes that was presented in Chapter 3. The regression equation which the former theory suggests will be applied separately to first agreement strikes and contract renewal strikes, while the regression equation that the latter theory suggests obviously will be applied to strikes during the term.

There are two reasons for dealing with first agreement strikes and contract renewal strikes separately. First, the bargaining theory applies separately to these two kinds of strikes (see p. 46 above). First agreement negotiations and strikes typically involve more precedent-setting issues and more tradeoffs, than do contract renewal negotiations and strikes. Moreover,


\textsuperscript{3} See, for example, Weiler 1976, 74, and Morris (1977), esp. 89.
the former presumably are more likely to end in "ruination" than are the latter. Indeed, as is indicated in Table 5 above, first agreement strikes in British Columbia culminated more frequently in the union's abandoning the strike, in strikers being replaced and in the operations being closed than did contract renewal strikes during 1945-75. Second, it was inferred above that there was a statistical difference in kind between contract renewal strikes and first agreement strikes (see pp. 98 - 102 above). First agreement strikes, for example, generally are of much longer duration than contract renewal strikes.

A regression equation which reflects the strike-as-an-investment and uncertainty features of the bargaining theory is

$$S_t = I + aX_{1t} + bX_{2t} + cX_{3t} + dX_{4t} + fX_{5t} + (g_1D_{1t} + g_2D_{2t} + \cdots + g_kD_{kt}) + e_t \quad \ldots \quad (12)$$

where the subscript, t, measures time and where $e_t$ is the error term. $S$ stands for strike measure and \{D_1, \ldots, D_k\} is the set of dummy variables which represent changes in labour legislation. I is the intercept term, while the set of regressors, \{X_1, X_2, X_3, X_4, X_5\} is composed of four economic "determinants" of strike activity (X_1, X_2, X_3, and X_4) suggested by the bargaining theory of Chapter 2 and one socio-economic variable (X_5).

\[5\] For an explanation of how these variables are suggested by the bargaining theory of Chapter 2, see pp. 50-53 and 69-73.
The regressant, $S$, will be replaced with the strike measures

\begin{align*}
\text{NS}_1 &= \text{number of first agreement strikes} \\
\text{NS}_2 &= \text{number of contract renewal strikes} \\
\text{NS}_1/C &= \text{number of first agreement strikes (NS}_1) \text{ divided by the number of new certificates (C)} \\
\text{NS}_2/X &= \text{number of contract renewal strikes (NS}_2) \text{ divided by the number of contract expiries (X)} \\
\text{DUR}_1 &= \text{average duration of first agreement strikes} \\
\text{DUR}_2 &= \text{average duration of contract renewal strikes.}
\end{align*}

$\text{NS}_1/C$, $\text{NS}_2/X$, $\text{DUR}_1$, and $\text{DUR}_2$ were suggested by the bargaining theory of Chapter 2.\(^6\) $\text{NS}_1$ and $\text{NS}_2$ were included so that we can compare our results with the results of earlier students of strike activity, who used the number and duration of strikes as regressants. $\text{NS}_1/C$ and $\text{NS}_2/X$ measure the incidence of strike activity and they are empirical estimates for the probability that "open" agreements will erupt into strikes. Incidence measures are considered better strike measures than are absolute measures (e.g., $\text{NS}_1$ and $\text{NS}_2$), since they reflect the structure of bargaining--particularly fluctuations in contract expirations or the issuance of new certificates.\(^7\)

\(^6\) See page 69 above.

\(^7\) See, for example, Kelly, 1976, 1-3. Kelly did not discuss the measure, $\text{NS}_1/C$, in his paper.
The four economic "determinants" of strike activity are

\[ X_1 = \frac{\Delta CPI_t}{CPI_{t-1}} \]  = percentage change in the consumer price index (CPI) from year \( t-1 \) to year \( t \);

\[ X_2 = u \]  = unemployment rate

\[ X_3 = P \]  = firm's ability to pay (i.e., profits)

\[ X_4 = |\Delta W_t / \Delta W_{t-1} - 1| \]  = absolute value of the deviation of \( \Delta W_t / \Delta W_{t-1} \) from one; and

where

\[ \Delta W_t / \Delta W_{t-1} \]  = rate of change of the past two year's changes in comparable wage settlements: \( \Delta W_t \) (i.e., \( W_t - W_{t-1} \)) being the change in year \( t \) and \( \Delta W_{t-1} \) (i.e., \( W_{t-1} - W_{t-2} \)) being the previous year's change.

It should be noted that \( X_1 \) (or \( \Delta CPI_t / CPI_{t-1} \)) is a proxy variable for the change in recently negotiated comparable wage settlements (RNCWS).

The bargaining theory of Chapter 2 suggested that changes in RNCWS were an economic "determinant" of strike activity (see pp. 50-53 above).

Changes in RNCWS are not included in (12) for two reasons. First, contractual wage rates were not available. Second, percentage increases in the consumer price index presumably will closely approximate percentage increases in RNCWS. (See, for example, Walsh, 1975, 50).

---

\( ^8 \)Strike-as-an-investment theories like A-J's also suggest that \( X_1, X_2, X_3, \) and \( X_4 \) be the regressors of measures of strike activity. (See, for example, A-J (1969).)
The economic "determinants" of interest dispute strikes (\(X_1, X_2, X_3,\) and \(X_4\)) exert an ambiguous impact on strike activity within the conceptual framework of the bargaining theory of this dissertation. (See pages 69 - 79 above.) Largely because the latter is a framework of uncertainty and because wage and strike outcomes are jointly determined, it is very difficult to trace the influence of economic determinants on strike activity. In other words, we have no expectations concerning the signs of \(b, c, d,\) and \(f.\)

By contrast, earlier students of Canadian strike activity generally speculated or posited that causal relationships existed between economic determinants and strike activity. Changes in the consumer price index (\(X_1\)) were supposed to "lead to divergence of bargaining attitudes" and, in turn, "to a rise in strike activity (Vanderkamp, 1970, 219)." The unemployment rate (\(X_2\)) was deemed to be inversely related with strike activity because tight (loose) labour markets provide more (fewer) opportunities for union members' finding alternative employment and they make it less likely (more likely) that the firm can hire employees to replace strikers.\(^9\) Moreover, tight (loose) product markets (assuming that they accompany tight (loose) labour markets) should increase (decrease) employers' resistance to unions' demands. (see Walsh, 1975, 49.) Increases in profits (\(X_3\)) were regarded as having an ambiguous effect on

\(^9\)Replacements can be hired for strikers, but professional strike breakers were banned from British Columbia in 1973. See Labour Code of British Columbia, statutes of British Columbia, 1973 (2nd Sess.), c. 122, ss. 1 (1) and 3 (2) (e).
strike activity, inducing union members to strike but employers to "settle at a higher wage rate without a strike (Smith, 1972, 669)." It was argued that rapid rates of money wage increase ($X_4$) reflected "an environment accommodative, and, therefore, should be inversely related to the level of strike activity (Walsh, 1975, 50)."

$X_5$ (or $A$), the average age of the non-agricultural work force can be interpreted as having come from the strike-as-an-investment theory of collective bargaining presented above. However, it is,

---

10 Walsh used the percentage change in firms' profits as a regressor in his study. We are restricted to using the absolute value of profits because the bargaining theory of Chapter 2 involved the absolute level of firm profits.

11 There is a difference between my formulation of the rate of change of changes in comparable wage rates ($X_4$) and those of Vanderkamp and Walsh. The difference is that mine involves the absolute value of deviations about one. My formulation avoids an asymmetrical effect that occurs, for example in Walsh's formulation of $X_4$. Walsh posited that there was an inverse relationship between the rate of wage change and strike activity, regardless of whether wages were increasing or diminishing (1975, 49). It is not clear, however, that a decrease in the rate of wage increases would not bring about an increase in strikes or lockouts as employers attempted to enforce wage increase reductions and as unions resisted them.

12 In this view, the average age of the work force serves in an inverse fashion as a proxy variable for employees' expected work span until retirement. Employees in the theory calculate the future earnings that are associated with a proposed wage settlement, using their expected work spans. They then compare these benefits with the benefits that they expect to receive from, say, rejecting the proposed settlement, striking and settling in future. Clearly, the older are the employees, the smaller is the expected work span and in turn the future earnings that are associated with a proposed settlement. However, the average age of B.C.'s work force only was between 39 and 41 years. The 25th and 26th years of earning span, for instance, would contribute relatively little to the present value of the employees' future income stream, given an interest rate of say, 105. Thus, the average age of the work force would exert a marginal influence on the decision, whether or not to strike.
perhaps, best regarded as a socio-economic variable that was added to the four economic determinants of interest dispute strikes. Walsh proposed including $X_5$ as a regressor in regression analysis of strike activity, but he considered the inclusion of $X_5$ outside the scope of his study (1975, 54). $X_5$ is intended to capture the hypothesis that the older people become, the more conservative they become and, therefore, the less strike-prone they become. In accordance with this hypothesis, $f$ should be negative for regressants that involve either the number or incidence of interest dispute strikes.

It is intended that the economic determinants ($X_1$, $X_2$, $X_3$, $X_4$) along with the socio-economic variable, $X_5$, "normalize" the measures of strike activity that will be substituted for $S_t$ in (12). The dummy variables representing changes in labour legislation ($D_1$, $D_2$, ..., $D_i$, ..., $D_k$) should explain some (but probably not all) of the variation in $S$ that is not explained by $X_1$, $X_2$, $X_3$, $X_4$, and $X_5$. We shall test whether or not the amount of variation in $S$ that was "explained" by ($D_1$, ..., $D_k$) was statistically significant or insignificant.

Each dummy variable, $D_i$, will assume a value of one during the year in which the statute to which it corresponds was enacted, subject to one proviso: that it came into force before midway through

---

13 Walsh cites Jamieson (1973, 101-104) as being the source of the hypothesis concerning age, militancy and strike-proneness.
the year. Each $D_i$ will assume a value of one during some or all successive years, and various dummy variable configurations will be substituted for $\{D_1,D_2,\cdots,D_k\}$ in (12), as explained below.

The economic determinants that will be used in a regression analysis of strikes during the term come from the variant of Rees' (1952) "pressure-valve" theory of wildcat strikes that was developed in Chapter 3. Employees in that theory have a tolerance limit for pent-up frustrations. Once their tolerance limits have been surpassed, a wildcat or "protest" strike will take place.

We added a factor to the factor that Rees viewed as influencing employees' tolerance limits for pent-up frustrations. As Rees argued, it is expected that employees will lower (raise) their "frustration thresholds" as the unemployment rate decreases (increases), because they feel that they enjoy more (less) job security. In other words the lower the unemployment rate, the greater will be the probability that employees will find alternative employment and the lower will be the probability that employers will be able to hire strike breakers to replace striking employees.

The factor that we added was that employees presumably will attain their "frustration thresholds" quicker, the more they experience a deterioration in the wages they earn. Their wages can deteriorate in real terms and/or in relation to recent wage settlements which affect those employees with whom the employees compare.
themselves.\textsuperscript{14} The regressor, $\frac{CPI_t}{CPI_{t-1}}$ or $X_1$ will be used as a proxy variable for both types of erosion of employees' expected economic standard.\textsuperscript{15} Moreover, to the extent that $X_1$ and the average duration of collective agreements are inversely correlated, $X_1$ should pick up the effects of the average duration of collective agreements in wildcat strikes.

The regression equation for strikes during the term is

$$S_t = I + \delta X_1 t + \bar{c} X_2 t + (\bar{h}_1 D_{1t} + \cdots + \bar{h}_i D_{it} + \cdots + \bar{h}_k D_{kt}) + \bar{e}_t$$

where the subscript, $t$, represents time, $\bar{e}_t$ is the error term and \{D$_1$, D$_2$, $\cdots$, D$_i$, $\cdots$, D$_k$\} are dummy variables which represent changes in labour legislation which concern strikes during the term. The strike measures, S, are as follows:

- $NS_3$ = number of strikes during the term
- $NS_3/F$ = number of strikes during the term ($NS_3$) divided by the number of contracts in force ($F$); and
- $DUR_3$ = average duration of strikes during the term

It is expected that $\delta > 0$ and $\bar{c} < 0$, as explained above.

\textsuperscript{14}Obviously, in order for employees' real wages to decline, there must either not be a cost-of-living adjustment clause in their contract or if there is one it must not keep wage increases "in line" with increases in the consumer price index.

\textsuperscript{15}As argued above, it is expected that wage increases will closely parallel increases in the consumer price index.
4.2 The Data

Both annual and quarterly data were collected. Unfortunately, only two data series covered the entire 1945-75 time period that was selected for this study. They were the strike data and the expiry data, both of which were used to construct the strike measures (S). Two data series, average weekly wages and salaries (W) and the consumer price index (CPI) extended from 1950 through 1975. The remaining three series covered various sub-portions of the 1950-75 time period. Before tax corporation profits in British Columbia (P) ran from 1966 through 1975 quarterly and from 1960 through 1975 on an annual basis. The two series that drew on Statistics Canada's Labour Force Survey were complete from 1953 through 1975 and also provided sporadic observations from 1945 through 1953. The variables were the unemployment rate (U) and the age composition (A) of the work force in manufacturing in British Columbia. P, U and A were backcast, in order to provide a comprehensive data base covering 1950 through 1975, and in order to increase degrees of freedom.

It would have been preferable to gather data concerning negotiated wage settlements, which average weekly wages and salaries are a proxy variable for. But, data on negotiated wage settlements are not readily available. Difficulties with average weekly wages and salaries is that they are sensitive to changes in such things as hours of work, shift schedules and employment, but negotiated wages clearly are not.

It was attempted to fill in gaps in the profit series through Statistics Canada. Unfortunately, the user-costs of culling profit data for British Columbia from the computer were prohibitive. (See A. L. Lorland, personal letter in my possession, June 7, 1977.)

The various data series used in this study are explained in Appendix C.
The strike data consisted of strike data published by the B.C. Department of Labour. Strikes were classified according to contract status through the use of strike data from a similar public agency which requested that it not be named. The expiry data consisted of two samples: a random sample and a sample somewhat larger than (but including) the random sample. Both samples were drawn from the files of Labour Canada's Collective Bargaining Division. Only the random sample was used to construct the number of expiries series \((X)\) and the number of contracts in force series \((F)\). Both \(X\) and \(F\), in turn, were used to construct the incidence measures, \(\frac{N_{S_2}}{X}\) and \(\frac{N_{S_3}}{F}\) respectively.

In constructing \(\frac{N_{S_2}}{X}\), it was necessary to determine the appropriate lag, if any, that existed between the dates when contract renewal strikes commenced and the dates when the corresponding collective agreements expired. The average lag was 102.33 days in British Columbia during 1945-75. (See Table 11.) For this reason, it was decided that \(X\) should be lagged one-quarter of a year behind \(N_{S_2}\).

Incidentally, at least two factors seem to influence the length of the interval between expiries and strike commencement dates. One factor is how close (far) the expiration data is to (from) the time when weather conditions are favourable for striking. For instance, the forest products industries, whose collective agreements expired during the late Spring or Summer months, had the shortest

---

19 The larger expiry sample, rather than the random sample, was used so that the matched expiry-strike sample would be as large as possible.
**TABLE 11**

The Interval Between Contract Expiries and Strike Commencement Dates
By Contract Status in British Columbia: 1945-75**

<table>
<thead>
<tr>
<th>Contract Status</th>
<th>Sample Size (Number)</th>
<th>Mean (Days) *</th>
<th>Standard Deviations (Days) *</th>
<th>Minimum Interval (Days) *</th>
<th>Maximum Interval (Days) *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewal</td>
<td>224</td>
<td>102.33</td>
<td>98.97</td>
<td>1</td>
<td>599</td>
</tr>
<tr>
<td>During Term</td>
<td>141</td>
<td>-327.33</td>
<td>245.75</td>
<td>-1042</td>
<td>-1</td>
</tr>
</tbody>
</table>

*Any missing expiry data means that the intervals are overstated.

**Includes strikes within the federal jurisdiction of the Canada Labour Code and its predecessor acts.
expiry-strike interval in British Columbia. (See Table 12.) The Summer months afford the most favourable weather conditions for striking in the forest products industries. Summer weather conditions also mean that the Summer months are the most propitious time to strike in construction, whose contracts expired during the late Winter or early Spring months and which had one of the longest expiry-strike intervals in British Columbia.\(^\text{20}\) (See Table 12.) The other factor is whether third party intervention into contract disputes is compulsory or voluntary. Longer intervals are expected when there is compulsion as opposed to voluntarism. Indeed, relatively long expiry-strike intervals were associated with the years during which compulsory conciliation procedures were practiced in British Columbia (1945-59, 1950-59 and 1960-69). By contrast, relatively short expiry-strike intervals occurred during 1970-75, the years during which voluntary mediation was practiced in British Columbia. (See Table 13.)

Two economic indicators, Gross B.C. Personal Income and Individual B.C. Personal Income, proved to be extremely good predictors of annual British Columbia profits as well as of each quarter's profits in British Columbia. The correlation coefficients between British Columbia annual profits (a) and Gross B.C. Personal Income (g) as well as Individual B.C. Personal Income (i) were respectively  \( r_{ag} = .980 \) and  \( r_{ai} = .981 \) for 1960-75. The correlation \( \ldots \)

\(^{20}\)Additional data concerning the monthly expiry-strike relationship are presented below in Appendix F.
TABLE 12
The Interval Between Contract Expiries and Strike Commencement Dates Classified by Contract Status and Industries in British Columbia: 1945-75

<table>
<thead>
<tr>
<th>Contract Status</th>
<th>Industry</th>
<th>Sample Size (Number)</th>
<th>Mean (Days)*</th>
<th>Standard Deviation (Days)*</th>
<th>Minimum Interval (Days)*</th>
<th>Maximum Interval (Days)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewal</td>
<td>MINING</td>
<td>19</td>
<td>93.74</td>
<td>133.84</td>
<td>1</td>
<td>529</td>
</tr>
<tr>
<td></td>
<td>MANUFACTURING:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Food &amp; Beverages</td>
<td>16</td>
<td>92.44</td>
<td>60.07</td>
<td>1</td>
<td>204</td>
</tr>
<tr>
<td></td>
<td>Pulp, etc.**</td>
<td>19</td>
<td>66.16</td>
<td>92.41</td>
<td>1</td>
<td>363</td>
</tr>
<tr>
<td></td>
<td>Logging, etc.***</td>
<td>10</td>
<td>27.80</td>
<td>30.48</td>
<td>1</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td>Wood Products***</td>
<td>3</td>
<td>90.67</td>
<td>66.36</td>
<td>15</td>
<td>139</td>
</tr>
<tr>
<td></td>
<td>Metal Products</td>
<td>11</td>
<td>82.82</td>
<td>128.33</td>
<td>2</td>
<td>438</td>
</tr>
<tr>
<td></td>
<td>Machinery†</td>
<td>13</td>
<td>51.54</td>
<td>51.55</td>
<td>1</td>
<td>168</td>
</tr>
<tr>
<td></td>
<td>Misc. Manu.</td>
<td>29</td>
<td>86.35</td>
<td>60.00</td>
<td>2</td>
<td>215</td>
</tr>
<tr>
<td></td>
<td>CONSTRUCTION</td>
<td>15</td>
<td>-377.24</td>
<td>239.35</td>
<td>-831</td>
<td>-23</td>
</tr>
<tr>
<td></td>
<td>TRANSPORTATION††</td>
<td>10</td>
<td>-444.40</td>
<td>417.41</td>
<td>-1034</td>
<td>-3</td>
</tr>
<tr>
<td></td>
<td>TRADE</td>
<td>2</td>
<td>-290.83</td>
<td>140.36</td>
<td>-1042</td>
<td>-67</td>
</tr>
<tr>
<td></td>
<td>SERVICES:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td>6</td>
<td>-356.00</td>
<td>244.78</td>
<td>-653</td>
<td>-5</td>
</tr>
<tr>
<td></td>
<td>Municipal</td>
<td>27</td>
<td>-287.43</td>
<td>251.14</td>
<td>-722</td>
<td>-2</td>
</tr>
<tr>
<td></td>
<td>Miscellaneous</td>
<td>9</td>
<td>-360.45</td>
<td>190.22</td>
<td>-661</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-180.13</td>
<td>177.12</td>
<td>-449</td>
<td>-7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-82.50</td>
<td>91.32</td>
<td>-197</td>
<td>-4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-603.00</td>
<td>418.02</td>
<td>-1042</td>
<td>-35</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-290.83</td>
<td>140.36</td>
<td>-1042</td>
<td>-67</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-444.40</td>
<td>417.41</td>
<td>-1034</td>
<td>-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-90.00</td>
<td>88.31</td>
<td>-255</td>
<td>-12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-441.00</td>
<td>38.63</td>
<td>-495</td>
<td>-393</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-408.50</td>
<td>143.54</td>
<td>-510</td>
<td>-307</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-127.80</td>
<td>103.44</td>
<td>-288</td>
<td>-53</td>
</tr>
</tbody>
</table>

* Any missing expiry data means that the intervals are overstated.
** Primarily pulp and paper: 1945-69; includes logging, etc. and wood products: 1970-75.
*** Covers: 1945-69.† Includes heavy electrical and transportation machinery.
†† Much of this industry lies in the federal jurisdiction.
<table>
<thead>
<tr>
<th>Contract Status</th>
<th>Years</th>
<th>Sample Size (Number)</th>
<th>Mean (Days)*</th>
<th>Standard Deviation (Days)*</th>
<th>Minimum Interval (Days)*</th>
<th>Maximum Interval (Days)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewal</td>
<td>1940-45</td>
<td>22</td>
<td>115.55</td>
<td>130.61</td>
<td>2</td>
<td>529</td>
</tr>
<tr>
<td></td>
<td>1950-59</td>
<td>58</td>
<td>127.85</td>
<td>77.10</td>
<td>2</td>
<td>419</td>
</tr>
<tr>
<td></td>
<td>1960-69</td>
<td>18</td>
<td>152.33</td>
<td>106.95</td>
<td>15</td>
<td>412</td>
</tr>
<tr>
<td></td>
<td>1970-75</td>
<td>107</td>
<td>78.13</td>
<td>102.12</td>
<td>1</td>
<td>599</td>
</tr>
<tr>
<td>During Term</td>
<td>1940-45</td>
<td>5</td>
<td>-156.40</td>
<td>153.46</td>
<td>-355</td>
<td>-7</td>
</tr>
<tr>
<td></td>
<td>1950-59</td>
<td>26</td>
<td>-249.54</td>
<td>243.33</td>
<td>-862</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>1960-69</td>
<td>4</td>
<td>-475.75</td>
<td>381.12</td>
<td>-1042</td>
<td>-246</td>
</tr>
<tr>
<td></td>
<td>1970-75</td>
<td>94</td>
<td>-356.93</td>
<td>240.89</td>
<td>-1034</td>
<td>-2</td>
</tr>
</tbody>
</table>

*Any missing expiry data means that the intervals are overstated.
coefficients for each quarter's (1, 2, 3, 4) profits were as follows from 1966 to 1975:

\[ r_1 = 0.970 \quad r_2 = 0.959 \quad r_3 = 0.973 \quad r_4 = 0.960 \]

\[ r_1 = 0.962 \quad r_2 = 0.962 \quad r_3 = 0.975 \quad r_4 = 0.963 \]

The finding, that both Gross and Individual B.C. Personal Income are very close substitutes for both annual and each quarter's B.C. profits, may have significance for future students of strike activity. Typically, data for national accounts statistics, such as B.C. Personal Income, are obtained much more easily than are data concerning profits. Our findings suggest that future researchers may be able to substitute national accounts statistics for profit variables in regression analyses of strike activity without significantly distorting the results they obtain.\(^{21}\)

Gross B.C. Personal Income (GPI) was used to backcast annual B.C. profits (PROF) from 1959 through 1950 and to backcast each quarter's B.C. profits, (PROF\(_1\), PROF\(_2\), PROF\(_3\), and PROF\(_4\)) from 1965 through 1950. The backcasting was conducted with a linear regression equation involving a logarithmic regressor [LN(GPI)] and logarithmic regressants

---

\(^{21}\)Earlier students of Canadian strike activity, for example, used various indicators of firms' ability to pay and/or the stage reached in the business cycle. For instance, Vanderkamp (1972) used the constant dollar value of Gross National Product as a proportion of the trend while Smith (1972) and Walsh (1975) respectively employed the profit share of GNP and the year-to-year percentage change in total after-tax corporate profits.
[LN(PROF), LN(PROF₁), LN(PROF₂), LN(PROF₃), and LN(PROF₄)]. The estimated quarterly profit data were adjusted randomly to sum to the annual profit data which covered 1960-65 and which were estimated for 1950-59. The quarterly profit data then were seasonally adjusted, using the SAMAQ option of the Time Series Processor computer package.

The unemployment rate (U) and the average age of the non-agricultural employed work force of British Columbia (A) also were backcast over three years: 1950-52. First, 1953-75 monthly observations of U and A were seasonally adjusted, using the X-11 computer program that institutions like the Bank of Canada use to seasonally adjust monthly data. There were unadjusted observations of U and A which were taken during one (sample) month of each quarter from 1950 through 1952. The unadjusted quarterly sample month observations of U in particular were quite volatile. Nonetheless, the 1950-52 quarterly sample month observations of U and A were included in the regressions used to backcast U and A, in order to "tie down" the 1950-52 portion of these regressions. The backcasting had the effect of smoothing out the unemployment rate series over the 1950-52 time period.

The estimated portions of the unemployment rate and profit series, in particular, may have deficiencies. The unemployment rate series, for example, was estimated over a time period, 1950-52, for which the recorded observations were very volatile. The estimated observations removed most, if not all, the volatility of this series

\[ A \text{ was backcast with a third-degree polynomial regression, while U was backcast with a linear regression. (See Appendix C.)} \]
during 1950-52. By contrast, the quarterly and annual profit series were backcast over 11/26ths and 16/26ths of the 1950-1975 time period. The margin for error could have been quite large for backcasting either or both of the two series. If it were, it might jeopardize the usefulness of those regression results which include the estimated data. We shall test statistically to determine whether or not regressions over data that include estimated observations yield essentially the same results as regressions over data that do not include estimated observations. Regressions including estimated observations are preferable to regressions without estimated observations, in order to maximize degrees of freedom for statistical tests of the labour legislation-strike relationship.

4.3 The Time Period to be Covered in the Regressions

Given possible inadequacies in backcasted data, the Chow test was used to determine whether or not backcasted data should be included in the regression analysis of this study. Four different time periods were used in the Chow test: (1) 1950-75, which included all the backcasted data and which was applied to both annual and quarterly data; (2) 1953-75, which included backcasted profit data and which was applied to quarterly and annual data; (3) 1960-75, which included no backcasted data and which was applied to annual data; and (4) 1966-75, which included no backcasted data and which was applied to quarterly data.

Two sets of regressions were run: restricted regressions (r) and unrestricted regressions (u). The restricted regression
equations consisted of either equation (12) or equation (13) and covered the 1950-75 time period. Each unrestricted regression equation consisted of a restricted regression to which a set of additional regressors had been added. The additional regressors corresponded to one of the three sub-periods of 1950-75 (1953-75, 1960-75 or 1966-75). They were constructed by multiplying each regressor from the corresponding restricted regression equation by a dummy variable whose value was one for years within the given sub-period of 1970-75 (e.g., 1960-75) but whose value was zero for years outside the sub-period (i.e., 1950-59). Dummy variable configurations were not included in the restricted estimates, in order to conserve degrees of freedom (particularly in regressions involving annual observations).

An F-test was used to test whether or not the restricted and unrestricted estimates differed statistically. The formula that was used to calculate the F-statistic was:

$$ F(L,T-K) = \frac{\sum e_{tr}^2 - \sum e_{tu}^2}{\sum e_{tu}^2} \cdot \frac{(T-K)}{L} $$

$$ = \frac{R_u^2 - R_r^2}{(1 - R_u^2)} \cdot \frac{(T-K)}{L} $$

... (14)

where e are residuals from regressions, T is the number of observations, K is the number of parameters fitted in the unrestricted version (u) and L is the number of restrictions in the restricted
version (r). The F-statistic has L and (T-K) degrees of freedom.  

The results that were obtained from applying the Chow test to the 1950-75 period and the sub-periods, 1953-75, 1960-75 and 1966-75, are presented in Table 14. There were six cases where the estimates of the unrestricted regressions differed at a statistically significant level from the estimates of the corresponding restricted regressions. The six cases, denoted by the regressant, were as follows: NS$_3$/C (1966-75 quarterly), NS$_3$ (1953-75 for both quarterly and annual data), and DUR$_3$ (1953-75 quarterly). Thus most of these cases involved strikes during the term and quarterly data.

It is inferred, for example, that the 1953-75 time period is appropriate for quarterly regressions involving NS$_3$, NS$_3$/F and DUR$_3$ and for annual regressions involving NS$_3$. The latter case is the only case in which an annual regression should be carried out over a sub-period of the 1950-75 time period. This case would not have been an exception, had we decided to accept the alternative hypothesis at levels of significance as low as five percent. (See Table 14.) However, it was decided that the threshold level for accepting the alternative hypothesis would be ten percent for annual regressions, since the annual regressions involve relatively few degrees of freedom—especially as compared with the quarterly regressions.

---

24 See, for instance, Johnston, 1972b, 206-207 or Neter and Wasserman, 1974, 262-264.

25 See, for example, Table 14.
<table>
<thead>
<tr>
<th>Regressants</th>
<th>Variables That Differ Statistically From Zero</th>
<th>1950-75 (Annual)</th>
<th>1953-75 (Annual)</th>
<th>1960-75 (Annual)</th>
<th>1950-75 (Quarterly)</th>
<th>1953-75 (Quarterly)</th>
<th>1966-75 (Quarterly)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$R^2_u$</td>
<td>$F$-Statistic (DF)</td>
<td>$R^2_u$</td>
<td>$F$-Statistic (DF)</td>
<td>$R^2_u$</td>
<td>$F$-Statistic (DF)</td>
<td>$R^2_u$</td>
</tr>
<tr>
<td>NS/C</td>
<td>.315</td>
<td>(1.836)</td>
<td>-</td>
<td>.361*</td>
<td>.408</td>
<td>(3.17)</td>
<td>.467</td>
</tr>
<tr>
<td>NS</td>
<td>.350</td>
<td>(4.898)</td>
<td>-</td>
<td>.579</td>
<td>.390</td>
<td>(3.17)</td>
<td>.907</td>
</tr>
<tr>
<td>DUR</td>
<td>.252</td>
<td>(1.385)</td>
<td>-</td>
<td>.293</td>
<td>.289</td>
<td>(3.17)</td>
<td>.584</td>
</tr>
<tr>
<td>NS2/X</td>
<td>.850</td>
<td>(10.037)</td>
<td>-</td>
<td>.847</td>
<td>1.370</td>
<td>(3.17)</td>
<td>.854</td>
</tr>
<tr>
<td>NS2</td>
<td>.252</td>
<td>(23.432)</td>
<td>-</td>
<td>.875</td>
<td>1.404</td>
<td>(3.17)</td>
<td>.883</td>
</tr>
<tr>
<td>DUR2</td>
<td>.369</td>
<td>(1.418)</td>
<td>-</td>
<td>.369</td>
<td>.961</td>
<td>(3.17)</td>
<td>.466</td>
</tr>
<tr>
<td>NS3/F</td>
<td>.379</td>
<td>(7.027)</td>
<td>+X1</td>
<td>.526</td>
<td>2.060</td>
<td>(3.20)</td>
<td>.062</td>
</tr>
<tr>
<td>NS3</td>
<td>.336</td>
<td>(5.629)</td>
<td>+X1</td>
<td>.541</td>
<td>2.98+</td>
<td>(3.20)</td>
<td>.218*</td>
</tr>
<tr>
<td>DUR3</td>
<td>.056</td>
<td>(0.806)</td>
<td>-</td>
<td>.239</td>
<td>1.52</td>
<td>(3.20)</td>
<td>.063**</td>
</tr>
</tbody>
</table>

* Statistically different from zero at the .1% level of significance
** Statistically different from zero at the 1% level of significance
*** Statistically different from zero at the 5% level of significance
† Statistically different from zero at the 10% level of significance
+ Positive coefficient
- Negative coefficient

$R^2_u$ $R^2$ for the unrestricted regression
$R^2_r$ $R^2$ for the restricted regression

In the cases where the degrees of freedom, (DF), were (3,17) for annual regressions, the pooled regressions in which there were more regressors resulted in matrices that were not positive-definite.

Quarterly data concerning new certificates were not available.

Profit data, which were backcast from 1959 through 1950 for annual data and from 1965 through 1950 for quarterly data, were not a regressor of strikes during the term. Consequently, no unrestricted regressions were run for those time periods.
There are several other key features to the regression results presented in Table 14. For instance, the restricted regression equations generally had yielded higher $R^2$s when they were applied to annual, as opposed to quarterly data. However, more quarterly than annual restricted regressions differed from zero at a level of statistical significance, presumably because the former regressions involved many more degrees of freedom than the latter ones. In addition, nine restricted regression lines were statistically different from zero at five percent or higher levels of significance. They included regressions having the following regressants: $NS_2$ (annual and quarterly), $DUR_1$ (quarterly), $NS_2/X$ (annual and quarterly), $NS_2$ (annual and quarterly), $NS_3/F$ (annual and quarterly, and $NS_3$ (annual and quarterly). This has economic significance, in that the economic "determinants" in (12) and (13) seem to have explained much of the variation in strike activity, particularly contract renewal strikes.

The fact that the restricted regression lines explain relatively little of the variation in the duration, as opposed to the number and incidence of strikes is consistent with the results that other students of strike activity obtained. (See, for instance, Walsh, 1975, 50-53 and especially Stern, 1978, 38.) Perhaps, the most convincing argument that this should be the case was put forward by Stern (1978). He argued that duration responded "primarily to specific local conditions (industry, community, plant, and interpersonal), type of strike (e.g., wildcat or new contract), and secondarily to organization and economic conditions (1978, 39)."
This study demonstrated that duration certainly responded to type of strike. (See, for example, Table 2 above.)26 One of the local conditions that Stern suggested was an important determinant of the duration of strikes was the past history of negotiations (1975, 41). The bargaining theory of Chapter 2 incorporated the past history of negotiations but no regressor in either equation (12) or equation (13) captures the past history of negotiations, largely because it is so difficult to quantify. Incidentally, the bargaining theory of Chapter 2 also suggested certain secondary economic conditions which influence the duration of strike activity, such as the dates on which union and firm defence funds expire. Such data were not included in (12) and (13) because of the high costs of collecting them.27

In addition, certain economic variables differed from zero at the 10% or lower levels of statistical significance in the quarterly and annual restricted regressions presented in Table 14. All of them had the signs that earlier students of Canadian strike activity expected. In particular, the unemployment rate \( U \) and average age of the non-agricultural work force \( A \) were inversely related to strike measures. By contrast, profits \( P \) and the percentage change in consumer price index \( X^1 \) were positively related to strike measures.

---

26 See also pages 98, 99 and 102 of Chapter 3.

27 Indeed, one of the key features of the bargaining theory presented in Chapter 2 was that certain factors which are not captured in the economic "determinants" of strike activity, govern the duration of the strike. They included the degree of financial stress that labour and management experience during the strike, the dates on which union and/or firm defence funds expire, and divergences in bargainers' perceptions and expectations as to the likelihood of attaining various possible outcomes to negotiations.
Primarily for financial reasons, regressions involving annual data will be used to conduct the regression analysis of the effects of changes in labour legislation on strike activity in British Columbia which follows. When decision-makers decide to strike or lockout, they probably rely much more on annual data rather than on quarterly data, particularly for such indicators as profits and unemployment. The advantage of annual data, as opposed to quarterly data, is that annual data embody the results of market activity during each of the four quarters. As such, they presumably provided a more accurate indication of the general trend in economic activity than do quarterly data, even if the quarterly data were seasonally adjusted (as was done in the current study). Finally, since the quarterly regressions and their annual counterparts yielded similar results (see Table 14), we shall focus below exclusively on the results concerning annual regressions.

4.4 1945-75 Changes in British Columbia Labour Legislation and Their Expected Effects on Strike Activity

A general shift took place in British Columbia's dispute resolution policy from 1945 through 1975. The labour statutes of British Columbia generally provided compulsory, normative and legalistic forms of dispute resolution during the first two decades or so of the 1945-75 time period.\(^\text{28}\) They also set out punitive measures

\(^{28}\) Changes in British Columbia's Labour legislation are explained in more detail in Appendix B. They were also explained to some extent in Chapter 3.
for dealing with unlawful activity—including strikes during the
term which these statutes proscribed.

Compulsory two-stage conciliation procedures were the
mechanism that these statutes provided for resolving interest disputes.
They were compulsory in the sense that they (along with certain other
procedures) had to be complied with before labour and management could
lawfully strike or lockout. The first stage of these conciliation
procedures consisted of intervention by a conciliation officer. This
intervention amounted to mediation and was an accommodative form of
third party intervention. It was accommodative in that it acted
through, rather than outside the collective bargaining process. For
example, one of the conciliation officer's main tools was persuasion.
The second stage of these conciliation procedures consisted of inter­
vention by a conciliation board. The conciliation board's composi­
tion was tri-partite, involving one labour representative, one
management representative and a neutral chairman.\textsuperscript{29} Intervention by
the conciliation board was normative (or adjudicative). It operated
outside the collective bargaining process, for it involved court­like proceedings and awards by third parties. The awards were the
contract settlements which the conciliation boards proposed (but which
were not binding).\textsuperscript{30}

\textsuperscript{29}Until 1954 conciliation boards automatically were estab­
lished after a conciliation officer had "booked off" a dispute. How­
ever, thereafter they were established at the discretion of the minister
of labour. (See, for example, Jamieson, 1973, 128-129.)

\textsuperscript{30}See, for example, Woods, 1973, 157-159.
Adjudication was the primary method for dealing with unlawful activity, including wildcat strikes. The courts of British Columbia dealt with unlawful strikes. The courts were empowered to take punitive actions, such as fining employees for engaging in unlawful strike activity, and they often took such actions. (See, for example, Carruthers, 1960.)

Compulsory, adjudicative, legalistic, and punitive methods of dispute resolution were supplanted during the last decade of 1945-75 by voluntary, accommodative forms of third party intervention. For instance, voluntary mediation was the mechanism for third party intervention into interest disputes. It was voluntary in that either labour or management unilaterally could request intervention by a mediator. In addition, rights disputes, including those rights disputes that had developed into wildcat strikes, could be resolved through a voluntary accommodative technique. Following union or employer request, the Labour Relations Board of British Columbia could dispatch industrial relations officers who intervened as mediators, for example, to unclog grievance machineries that had become clogged.

The aims of this accommodative approach to rights disputes and wildcat strikes included opening up the channels of communications between labour and management, attacking the causes of grievances and thereby avoiding the festering of grievances, so that fewer wildcat strikes might occur. By contrast, proponents of the accommodative approach to labour relations claimed, for example, that an adjudicative or litigious approach to labour relations was directed
at the symptom rather than the underlying cause of industrial disputes—particularly wildcat strikes. (See, for instance, Weiler, 1977, 66-71.)

The accommodative approach to labour relations also called for governmental intervention, adjudication and the imposition of punitive remedies, in order to protect the public interest. Such actions were treated and used as last resorts. For instance, the Labour Relations Board of British Columbia, to whom the authority to determine the legality of strikes, lockouts and picketing was transferred from the courts of British Columbia, very rarely invoked punitive remedies (see Weiler, 1977). The Labour Relations Board also was empowered to arbitrate negotiations for a first agreement, if it considered that either labour or, more likely, management were guilty of not "bargaining in 'good faith.'" But it applied this remedy infrequently (see Weiler, 1976, 77). The threat of intervention adjudication and punitive remedies was employed to encourage labour and management to use accommodative intervention and thereby to develop the ability to resolve their labour relations problems by themselves.  

Compulsory, normative, legalistic, or punitive forms are expected to have an ambiguous effect on the level of strike activity, _cet. par._ Compulsion may promote strike activity, rather than impede it. Elements that will contribute to the success or failure of compulsion include the timeliness of intervention, the skills possessed by the third parties who intervene, and labour and management's commitment

---

31 Also see Chapter 3 above.
to compulsion. If, for example, labour and management are not committed to compulsion, they, in effect, may postpone negotiations and strike action until after they have complied with the compulsory dispute resolution procedures for interest disputes. Contract settlements proposed through normative third party intervention into interest disputes need not be acceptable to labour and management. Moreover, they establish objectives which labour and management, whose interests often conflict, might strive to improve upon. Thus, they may provoke more impasses or prolong industrial disputes longer than otherwise. Finally, the threat of legal solutions or punitive remedial action presumably will not deter either labour or management from engaging in unlawful activity, including unlawful strikes, if either of them perceives that the benefits of unlawful strike activity outweigh the costs thereof.

By contrast, accommodative, voluntary methods of dispute resolution which are backed by the threat of adjudication or punitive remedies as a last resort are expected to reduce the level of strike activity, everything else the same. This expectation is based primarily upon the problem-solving possibilities of accommodative intervention. The Labour Relations Board of British Columbia claimed, for example, that it had been relatively successful in resolving disputes where industrial relations officers were dispatched as mediators, for example, to unclog clogged grievance machineries. The resolution

32See, for example, Jamieson, 1973, 125-142.

33See Labour Relations Board of British Columbia, Annual Reports, 1975-76 or Carter, 1976, 6-7.
of these grievances presumably resulted in fewer wildcat strikes. Moreover, voluntarism, as compared with, say, compulsion, might allow for more timely third party adjudication—provided that neither labour nor management regarded requesting mediation as a sign of weakness. Finally, the threat of adjudication or punitive remedies should encourage labour and management to rely upon the problem-solving features of accommodation, since the Labour Relations Board of British Columbia, the Cabinet and the Minister of Labour infrequently invoked such measures.  

During 1945-75 basically two labour statutes embodied the accommodative approach to labour relations: the Mediation Services Act (1972) and the Labour Code of British Columbia (1973). The Mediation Services Act provided voluntary mediation as the mechanism for resolving interest disputes. The Labour Code enshrined the accommodative approach to labour relations. Those two statutes, therefore, should have a negative influence on 1970-75 strike activity in British Columbia. By contrast, the remainder of British Columbia's 1945-75 labour statutes generally set out compulsory, normative, legalistic or punitive forms of dispute resolution. They, consequently, should have an ambiguous effect on strike activity in British Columbia from 1945 through 1975.

Changes in labour legislation were organized into categories, in order to study qualitative differences in their impact on strike activity. The criterion that was used to distinguish among these

34 See Chapter 3 for a discussion of the use of weapons from the "arsenal of weapons" as last resorts.

35 See, for example, Arthurs (1975), Weiler (1976), Matkin (1975), and International Labor Law Committee, Section of Labor Relations Laws, American Bar Association (1977). See also Appendix B below.
categories was the extent to which the statutory changes seemed to affect those portions of the general labour relations laws which were deemed to most influence strike activity. The latter included sections dealing with (1) the nature and operation of the dispute resolution machineries that these acts set out, (2) the remedial actions that could be taken against unlawful activity, including wildcat strikes, (3) the nature and scope of picketing and lawful strike and lockout activity, (4) the groups of employees to whom legally sanctioned collective bargaining was available, and (5) the process whereby unions and employers' associations acquire exclusive bargaining rights (i.e., the certification and accreditation processes, respectively). These factors influence the rate of reaching impasse as follows: factors (1) and (2), as explained above; factor (3) through the union and firm's "bargaining power," as discussed by Chamberlain (1951), for example; and factors (4) and (5) through the scope and structure of bargaining.

Four categories were identified: "all changes" (AC), "nearly all changes" (NAC), "important changes" (IC), and "fewest important changes" (FIC). AC should have the least statistically significant impact on strike activity, cet. par., since it includes all statutory changes. NAC should have slightly more of a statistically significant impact than AC on strike activity, since very minor changes which were included in AC were deleted from NAC. In turn, NAC, which includes those statutory changes that could have an important statistical influence on strike activity, should exert a
lesser influence on strike activity than IC, which includes all changes which were considered to exert an important influence on strike activity. Marginally important statutes were deleted from IC to form FIC, which should influence strike activity the most in a statistically significant sense.

4.5 Hypotheses to be Tested and Dummy Variable Configurations

Two alternative hypotheses, $H_1$ and $H_2$, will be tested. $H_1$ holds that changes in the level of strike activity accompany each change in labour legislation. $H_1$ will be said to test for "structural shifts." $H_2$ holds that brief (one-year or two-year) changes in the level of strike activity accompany each change in labour legislation, but that thereafter there is a return to the previous level of strike activity. $H_2$ will also be referred to as the "learning to play the old game according to the new rules" hypothesis. The null hypothesis, $H_0$, is that changes in labour legislation have no effect on the level of strike activity.

Structural dummy variable configurations were constructed for all four categories of changes in labour legislation--AC, NAC, IC, and FIC. They will be denoted respectively as "all dummies" (AD), "nearly all dummies" (NAD), "important dummies" (ID) and "fewest important dummies" (FID). It was assumed that only the most significant changes in labour legislation would exert brief effects on strike activity. The latter will be denoted as "learning the new rules in one year" (LNR1) and "learning" the new rules in two years (LNR2).
The dummy variable schemes--AD, NAD, ID, FID, LNR1, and LNR2—are depicted in Tables 15, 16 and 17 below. They differ according to type of strike: first agreement strike, contract renewal strike, or strike during the term. Each dummy variable in the schemes was turned "on" (i.e., took on a value of one) during the year in which the corresponding statute came into force, unless that statute was in force during less than one-half of that year. Otherwise, the dummy variable was turned "on" during the following year. Each dummy variable in the structural configurations (AD, NAD, ID, FID) remained "on" during successive years until the next statute of the given configuration was in force for over half a year. By contrast, each dummy variable in the configuration, LRN1 (LNR2) was "on" during the first year (and the next year) that the corresponding statute was in force for over half a year. All dummy variables were "off" (i.e., took on a value of zero), for the remainder of the 1950-75 time period.

4.6 General Effects of Changes in Labour Legislation on Strike Activity in British Columbia: 1950-75

The F-test that was used above in the Chow test was used to test whether or not the addition of each of the various dummy variable configurations to a restricted regression equation resulted in a statistically significant increase in $R^2$, comparing the restricted and unrestricted regression estimates. The alternative hypothesis was that not all of the coefficients of the dummy variable scheme equalled zero. The null hypothesis was that they all equalled zero.
<table>
<thead>
<tr>
<th>Name of Dummy Variable</th>
<th>Date &quot;On&quot;</th>
<th>Date &quot;Off&quot;</th>
<th>Name of Statute</th>
</tr>
</thead>
<tbody>
<tr>
<td>$D_{C2}$</td>
<td>1948</td>
<td>1954</td>
<td>Industrial Conciliation and Arbitration Act</td>
</tr>
<tr>
<td>$D_{C3}^*$</td>
<td>1955</td>
<td>1960</td>
<td>Labour Relations Act</td>
</tr>
<tr>
<td>$D_{C4}^*$</td>
<td>1961</td>
<td>1968</td>
<td>Labour Relations Act Amendment Act, 1961</td>
</tr>
<tr>
<td>$D_{C5}$</td>
<td>1969</td>
<td>1972</td>
<td>Mediation Commission Act</td>
</tr>
<tr>
<td>$D_{C6}$</td>
<td>1973</td>
<td>1973</td>
<td>Mediation Services Act</td>
</tr>
<tr>
<td>$D_{C1}^*$</td>
<td>1955</td>
<td>1968</td>
<td>Labour Relations Act</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strikes During the Term</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$D_{G3}^{**}$</td>
<td>1948</td>
</tr>
<tr>
<td>$D_{G4}^{**}$</td>
<td>1955</td>
</tr>
<tr>
<td>$D_{G2}$</td>
<td>1959</td>
</tr>
<tr>
<td>$D_{G1}^{**}$</td>
<td>1948</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Substitution of $D_{C1}$ for $D_{C3}$ and $D_{C4}$ yields nearly all dummy variables

** Substitution of $D_{G1}$ for $D_{G3}$ and $D_{G4}$ yields nearly all dummy variables

(+) Make up important dummy schema

(+++) Make up fewest important dummy schema

(I) Intercept term
<table>
<thead>
<tr>
<th>Name of Variable</th>
<th>Date &quot;On&quot;</th>
<th>Date &quot;Off&quot;</th>
<th>Name of Statute</th>
</tr>
</thead>
<tbody>
<tr>
<td>D_p1</td>
<td>1955</td>
<td>1955</td>
<td>Labour Relations Act</td>
</tr>
<tr>
<td>D_p2</td>
<td>1969</td>
<td>1969</td>
<td>Mediation Commission Act</td>
</tr>
<tr>
<td>D_p3</td>
<td>1973</td>
<td>1973</td>
<td>Mediation Services Act</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Statute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour Relations Act</td>
</tr>
<tr>
<td>Mediation Commission Act</td>
</tr>
<tr>
<td>Mediation Services Act</td>
</tr>
<tr>
<td>Labour Code of British Columbia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Variable</th>
<th>Date &quot;On&quot;</th>
<th>Date &quot;Off&quot;</th>
<th>Name of Statute</th>
</tr>
</thead>
<tbody>
<tr>
<td>D_p1</td>
<td>1955</td>
<td>1955</td>
<td>Labour Relations Act</td>
</tr>
<tr>
<td>D_p5</td>
<td>1959</td>
<td>1959</td>
<td>Trade-unions Act</td>
</tr>
<tr>
<td>Name of Dummy Variable</td>
<td>Date &quot;On&quot;</td>
<td>Date &quot;Off&quot;</td>
<td>Name of Statute</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------</td>
<td>-----------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>$D_{H1}$</td>
<td>1955</td>
<td>1956</td>
<td>Labour Relations Act</td>
</tr>
<tr>
<td>$D_{H2}$</td>
<td>1969</td>
<td>1970</td>
<td>Mediation Commission Act</td>
</tr>
<tr>
<td>$D_{H3}^*$</td>
<td>1974</td>
<td>1975</td>
<td>Labour Code of British Columbia</td>
</tr>
<tr>
<td>$D_{H4}^{**}$</td>
<td>1973</td>
<td>1974</td>
<td>Mediation Services Act</td>
</tr>
</tbody>
</table>

**For first agreement strikes**

**For contract renewal strikes**

<table>
<thead>
<tr>
<th>Name of Dummy Variable</th>
<th>Date &quot;On&quot;</th>
<th>Date &quot;Off&quot;</th>
<th>Name of Statute</th>
</tr>
</thead>
<tbody>
<tr>
<td>$D_{H1}$</td>
<td>1955</td>
<td>1956</td>
<td>Labour Relations Act</td>
</tr>
<tr>
<td>$D_{H5}$</td>
<td>1959</td>
<td>1960</td>
<td>Trade-unions Act</td>
</tr>
<tr>
<td>$D_{H3}$</td>
<td>1974</td>
<td>1975</td>
<td>Labour Code of British Columbia</td>
</tr>
</tbody>
</table>
Because the annual unrestricted regressions have only between 15 and 20 degrees of freedom, it was decided to conduct statistical tests using levels of significance as high as the ten percent level, as noted above.\(^{36}\)

Tables 18 through 21 depict the regression results that were obtained when the dummy variable schemes--AD, NAD, ID, FID, LNR1, and LNR2--were added to unrestricted regression tables.\(^{37}\) The results presented in Tables 18-20 were used to calculate the results presented in Table 21. The latter involve the following calculation:

\[
[F(L,T-K) - F_{0.90}(L,T-K)]/F_{0.90}(L,T-K) \quad \ldots \quad (15)
\]

where \(F(L,T-K)\), the value of the F-statistic, was defined in expression (14) and comes from Tables 18 through 20, and where \(F_{0.90}(L,T-K)\) was the value of the F-distribution, upper 10\% points, for \((L,T-K)\) degrees of freedom. The higher is the \(R^2\) of the unrestricted regression equation, \(R^2_u\), the higher will be expression (15), for given degrees of freedom. If expression (15) is positive, then the dummy variable scheme that was added to the restricted regression equation differs statistically from zero at the 10\% or lower levels of significance. If expression (15) is negative, it measures the percentage by which the \(R^2\) of the unrestricted regression, \(R^2_u\), fell short of the value for \(R^2_u\) that is necessary for the dummy variable scheme to differ from zero at the 10\% level of significance.

\(^{36}\)See footnote 25 of this chapter.

\(^{37}\)Tables 18-21 do not present the regression results where DUR\(_0\) was the regressant, since they involved very low \(R^2\). (See Table 14 above.)
<table>
<thead>
<tr>
<th>Dummy Variable Configuration</th>
<th>No Dummy Variables</th>
<th>Fewest Important Dummies</th>
<th>Important Dummies</th>
<th>Nearly All Dummies</th>
<th>All Dummies</th>
<th>Learning New Rules in 1 Year</th>
<th>Learning New Rules in 2 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>( R^2 ) with NS/c, as Regressant</td>
<td>.315</td>
<td>.469</td>
<td>.469</td>
<td>.485</td>
<td>.486</td>
<td>.431</td>
<td>.480</td>
</tr>
<tr>
<td>F-Statistic</td>
<td>1.643</td>
<td>1.160</td>
<td>1.320</td>
<td>.998</td>
<td>.815</td>
<td></td>
<td>1.784</td>
</tr>
<tr>
<td>Variables Statistically Different from Zero</td>
<td>(+p^+ + D_{c5}^+)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(+p^+ - D_{H1}^+)</td>
<td></td>
</tr>
</tbody>
</table>

| \( R^2 \) with NS, as Regressant | .550              | .694                     | .695             | .698              | .698      | .645                      | .667                        |
| F-Statistic                | 2.667             | 1.902                    | 1.960            | 1.470             | 1.070     |                           | 2.480^†                     |
| Variables Statistically Different from Zero | \(+p^{***} - I^{+}\) | \(+p^{***} + D_{c5}^{***}\) | \(+p^+\)         | \(+p^+\)          | \(+p^{***} - D_{H1}^{+}\) | \(+D_{H2}^{†}\)            |

| \( R^2 \) with Dur, as Regressant | .257              | .460                     | .465             | .483              | .488      | .541                      | .639                        |
| F-Statistic                | 2.130             | 1.555                    | 1.805            | 1.354             | 2.475^†   |                           | 5.996**                     |
| Variables Statistically Different from Zero | \(-X^+\)          | \(-U^+\)                 | \(-U^{++}\)     | \(+D_{p2}^{***}\) | \(-U^{***} + p^{***}\)  | \(-D_{H1}^+ + D_{H2}^{*}\) |

* Statistically different from zero at the .1% level of significance
** Statistically different from zero at the 1% level of significance
*** Statistically different from zero at the 5% level of significance
† Statistically different from zero at the 10% level of significance
+ Positive coefficient
- Negative coefficient

\( D_{c5}^{}, D_{p2}^{}, and D_{H2}^{} \) correspond to the Mediation Commission Act
\( D_{H1}^{+} \) corresponds to the Labour Relations Act
### Table 19

<table>
<thead>
<tr>
<th>Dummy Variable Configuration</th>
<th>No Dummy Variables</th>
<th>Fewest Important Dummies</th>
<th>Important Dummies</th>
<th>Yearly All Dummies</th>
<th>All Dummies</th>
<th>Learning New Rules in 1 Year</th>
<th>Learning New Rules in 2 Years</th>
</tr>
</thead>
</table>

| R^2 with NS^2/X as Regressant | .810               | .825                     | .834              | .831              | .831       | .864                        | .952                        |
| F-Statistic                  | -                  | .486                     | .578              | .497              | .373       | 1.553                       | 2.135                       |
| Variables Statistically Different from Zero | -                       | -                        | -                 | -                 | -          | +p†                        | -D_H4**                     |
|                              | -A***              | -                        | -                 | -                 | -          | +p***                       | -D_H4***                    |

| NS^2                         | .854               | .857                     | .861              | .861              | .866       | .922                        | .925                        |
| F-Statistic                  | -                  | .119                     | .201              | .201              | .269       | 3.437**                     | 5.364*                      |
| Variables Statistically Different from Zero | +p***                  | -                        | -                 | -                 | -          | +p**                        | -D_P4**                     |
|                              | +p***              | -                        | -                 | -                 | -          | +p**                        | -D_H4**                     |
|                              | +p†                | +X1†                     |                   |                   | -C2**      | -C3†                        | -C3†                        |

| DUR^2                        | .262               | .331                     | .385              | .601a            | .601a      | .273                        | .263                        |
| F-Statistic                  | -                  | .584                     | .792              | 3.398**          | 2.634†     | .061                        | .093                        |
| Variables Statistically Different from Zero | -                       | -                        | -                 | -                 | -C3**      | -C3†                        | -C3†                        |
|                              | -                  | -                        | -                 | -                 | -          | -C2†                        | -C2†                        |

* Statistically different from zero at the .1% level of significance
** Statistically different from zero at the 1% level of significance
*** Statistically different from zero at the 5% level of significance
+ Statistically different from zero at the 10% level of significance
- Positive coefficient
- Negative coefficient

D_P3 corresponds to the Mediation Services Act
D_P4 and D_H4 correspond to the Labour Code of British Columbia
D_C2 corresponds to the Industrial Conciliation and Arbitration Act
D_C3 corresponds to the Labour Relations Act

The marked increase in R^2 as compared with the R^2 where no dummy variables were included, was due mainly to the high degree of multi-collinearity among the dummy variables that make up these series. The multi-collinearity was obvious in the correlation matrix for regressors.
### Table 20

**F-Test That Various Dummy Variable Configurations Are Statistically Different From Zero for Strikes During the Term: 1950-75 Annual or 1953-75 Annual**

<table>
<thead>
<tr>
<th>Dummy Variable Configuration</th>
<th>No Dummy Variables</th>
<th>Fewest Important Dummies</th>
<th>Important Dummies</th>
<th>Nearly All Dummies</th>
<th>All Dummies</th>
<th>Learning New Rules in 1 Year</th>
<th>Learning New Rules in 2 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degrees of Freedom</td>
<td>(2,23)</td>
<td>(2,21)</td>
<td>(3,20)</td>
<td>(3,20)</td>
<td>(4,19)</td>
<td>(4,19)</td>
<td>(1,20)</td>
</tr>
</tbody>
</table>

#### 1950-75 Annual

<table>
<thead>
<tr>
<th>Degrees of Freedom</th>
<th>(2,21)</th>
<th>(2,21)</th>
<th>(3,20)</th>
<th>(3,20)</th>
<th>(4,19)</th>
<th>(4,19)</th>
<th>(3,20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2$ with $NS_3/F$ as Regressant</td>
<td>.379</td>
<td>.392</td>
<td>.404</td>
<td>.404</td>
<td>.425</td>
<td>.414</td>
<td>.432</td>
</tr>
<tr>
<td>F-Statistic</td>
<td>2.25</td>
<td>2.25</td>
<td>2.30</td>
<td>2.20</td>
<td>2.80</td>
<td>2.80</td>
<td>2.24</td>
</tr>
<tr>
<td>Variables Statistically Different from Zero</td>
<td>$X_1^{**}$</td>
<td>$X_1^{***}$</td>
<td>$X_1^{***}$</td>
<td>$X_1^{***}$</td>
<td>$X_1^{***}$</td>
<td>$X_1^{***}$</td>
<td>$X_1^{***}$</td>
</tr>
</tbody>
</table>

#### 1953-75 Annual

<table>
<thead>
<tr>
<th>Degrees of Freedom</th>
<th>(2,20)</th>
<th>(2,18)</th>
<th>(3,17)</th>
<th>(3,17)</th>
<th>(4,16)</th>
<th>(4,16)</th>
<th>(3,17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$NS_3$</td>
<td>.523</td>
<td>.644</td>
<td>.658</td>
<td>.653</td>
<td>.667</td>
<td>.674</td>
<td>.654</td>
</tr>
<tr>
<td>F-Statistic</td>
<td>3.059</td>
<td>2.237</td>
<td>2.237</td>
<td>1.733</td>
<td>1.853</td>
<td>2.145</td>
<td></td>
</tr>
<tr>
<td>Variables Statistically Different from Zero</td>
<td>$X_1^{*}$</td>
<td>$X_1^{*}$</td>
<td>$0_{G1}^{+}$</td>
<td>$0_{G2}^{***}$</td>
<td>$X_1^{*}$</td>
<td>$X_1^{*}$</td>
<td>$X_1^{*}$</td>
</tr>
</tbody>
</table>

* Statistically different from zero at the 1% level of significance
** Statistically different from zero at the 2% level of significance
*** Statistically different from zero at the 5% level of significance
+ Positive coefficient
– Negative coefficient

$0_{G1}$ Industrial Conciliation and Arbitration Act plus Labour Relations Act
$0_{G2}$ Trade-Union Act
$0_{G6}$, $0_{H3}$ Labour Code of British Columbia

*The regressions for DUR yielded such low $R^2$'s that they were not included in this table. (see Table 21.)*

*The Important Dummies and Nearly all Dummies configurations are the same.
<table>
<thead>
<tr>
<th>Regressant</th>
<th>Fewest Important Dummies</th>
<th>Important Dummies</th>
<th>Nearly All Dummies</th>
<th>All Dummies</th>
<th>Learning New Rules in 1 Year</th>
<th>Learning New Rules in 2 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS&lt;sub&gt;3&lt;/sub&gt;/C</td>
<td>-32.8</td>
<td>-50.4</td>
<td>-43.6</td>
<td>-56.1</td>
<td>-65.2</td>
<td>-27.1</td>
</tr>
<tr>
<td>NS&lt;sub&gt;1&lt;/sub&gt;</td>
<td>9.0&lt;sup&gt;+&lt;/sup&gt;</td>
<td>-18.5</td>
<td>-16.2</td>
<td>-35.3</td>
<td>-54.3</td>
<td>1.4&lt;sup&gt;+&lt;/sup&gt;</td>
</tr>
<tr>
<td>DUR&lt;sub&gt;1&lt;/sub&gt;</td>
<td>-12.9</td>
<td>-33.5</td>
<td>-22.8</td>
<td>-40.4</td>
<td>5.8&lt;sup&gt;+&lt;/sup&gt;</td>
<td>45.1**</td>
</tr>
<tr>
<td>NS&lt;sub&gt;2&lt;/sub&gt;/X</td>
<td>-80.1</td>
<td>-75.3</td>
<td>-78.8</td>
<td>-83.6</td>
<td>-32.1</td>
<td>-12.7</td>
</tr>
<tr>
<td>NS&lt;sub&gt;2&lt;/sub&gt;</td>
<td>-95.1</td>
<td>-91.4</td>
<td>-91.4</td>
<td>-98.2</td>
<td>49.1**</td>
<td>119.3*</td>
</tr>
<tr>
<td>DUR&lt;sub&gt;2&lt;/sub&gt;</td>
<td>-76.1</td>
<td>-66.1</td>
<td>45.1**</td>
<td>15.9&lt;sup&gt;+&lt;/sup&gt;</td>
<td>-97.4</td>
<td>-99.7</td>
</tr>
</tbody>
</table>

|                  | 2.446                    | 2.339             | 2.339             | 2.273       | 2.339                      | 2.446                        |
| (L, T-k)         | (3, 17)                  | (4, 16)           | (4, 16)           | (5, 15)     | (4, 16)                    | (3, 17)                      |

|                  | -91.3                    | -88.2             | -88.2<sup>b</sup> | -83.3       | -87.5                      | -73.9                        |

|                  | 2.577                    | 2.380             | 2.380             | 2.271       | 2.271                      | 2.380                        |
| (L, T-k)         | (2, 21)                  | (3, 20)           | (3, 20)           | (4, 19)     | (4, 19)                    | (3, 20)                      |

|                  | 16.2<sup>+</sup>         | -8.5              | -8.5<sup>b</sup>  | -26.0       | -20.8                      | -12.3                        |
| (L, T-k)         | 2.632                    | -                 | 2.446             | 2.339       | 2.339                      | 2.446                        |

|                  | (2, 18)                  | (3, 17)           | (4, 16)           | (4, 16)     | (3, 17)                    |                              |

* Statistically different from zero at the .1% level of significance
** Statistically different from zero at the 1% level of significance
*** Statistically different from zero at the 5% level of significance
† Statistically different from zero at the 10% level of significance

The percentage difference is \([F(L, T-k) - F_{0.90}(T-k)] / F_{0.90}(T-k)\), where \(F_{0.90}(T-k)\) comes from the F-Distribution.

The Important Dummies and Nearly All Dummies configurations are the same.

(L, T-k) Degrees of freedom where L are the number of restrictions in the restricted regression equation; where T is the number of observations; and where k is the number of parameters fitted in the unrestricted regression equation.
FID, LNR1 and particularly LNR2 had the greatest impact on strike activity, in the sense that they generally yielded the greatest values for expression (15). (See Table 21.) In fact, one of the dummy variable schemes—FID, LNR1 and LNR2—resulted in the largest values for expression (15) in each of the regression equations but one (see Table 21). More importantly, they made statistically significant contributions to $R^2$ in seven instances: FID for $N_{S_1}$ and $N_{S_3}$; LNR1 for $D_{UR_1}$ and $N_{S_2}$; and LNR2 for $N_{S_1}$, $D_{UR_1}$ and $N_{S_2}$. By contrast, only two other dummy variable configurations resulted in increases in $R^2$ that were statistically different from zero at the 10% or lower levels of significance: AD and NAD for $D_{UR_2}$. The alternative hypothesis, that not all coefficients of the dummy variable scheme equalled zero, was accepted in these nine cases. In other words, it is inferred that changes in labour legislation had an impact on strike activity through the dummy variable schemes that represented them in the nine cases.

By statistical inference, "all changes," "nearly all changes" and "important changes" in labour legislation had much less impact on strike activity in British Columbia during 1950-75 than "fewest important changes" in legislation did. The AD and NAD dummy variable

38 There apparently was considerable interdependence among the dummy variables that made up the AD and NAD configurations. By "considerable" we mean that the correlation coefficients for the dummy variables in AD and NAD were at least .69 and generally greater than .88 in the regression equation involving $D_{UR_2}$ as the regressant. The presence of multicollinearity, however, strengthens our conclusion that AD and NAD differed from zero at the 10% or lower levels of statistical significance. The effect of multicollinearity among AD and NAD would be to lower $R^2$ from what it otherwise would be for given degrees of freedom. (See, for example, Johnston, 1972b, 160 or Neter and Wasserman, 1973, 250-254.)
configurations only yielded results that were statistically different from zero at the 10% or lower levels of significance where $DUR_2$ was the regressant, as noted above. It was inferred that AD and NAD had no impact on strike activity in all the other regressions. (See Table 21.) Somewhat contrary to our expectations, the ID dummy variable exerted no statistically significant influence on strike activity. (See Table 21.) On the whole, the fact that AD, NAD and ID (but not FID, LNR1 or LNR2) exerted little influence on strike activity conformed with our a priori expectations that very important changes in labour legislation would have a greater impact on strike activity than would changes of less importance.

Of the three dummy variables configurations that incorporated "fewest important changes" in labour legislation (FID, LNR1 and LNR2) LNR2 generally had the greatest impact on strike activity. Two criteria were used to compare the impact on strike activity of the dummy variable schemes, LNR1, LNR2 and FID. One criterion was which of the three dummy variable schemes consistently yielded the largest measure for expression (15). The other criterion was which of the three dummy variables had the greatest number of regressions where it differed from zero in a statistically significant sense. LNR2 outperformed LNR1 and FID in both regards. (See Table 21.)

Moreover, LNR2 generally differed statistically from zero at the 10% or lower levels of significance whenever LNR1 and FID differed statistically from zero at the 10% or lower levels of significance (see Table 21). There was, however, one exception. It occurred where NS$_3$ was the regressant. In this case, FID (but not
LNR2) differed significantly from zero in a statistical sense. (See Table 20.) But the addition of LNR2 to the restricted regression involving NS3 as regressant did increase the $R^2_u$ of the unrestricted regression, $R^2$, to 12.3% below the value of $R^2_u$ that was necessary for LNR2 to differ from zero at the 10% level of significance. (See Table 21.) How was it that LNR2, on the one hand, and LNR2 and FID, on the other hand, nearly always differed from zero at the 10% or lower levels of statistical significance, when they were added to the same restricted regression equation? The answer apparently stems from the structure of LNR2, as compared with the structures of LNR1 and SS4.

LNR2 contains LNR1. Each dummy variable in LNR2 is "on" (i.e., assumes a value of one) during each year that its counterpart in LNR1 is on. Furthermore, each dummy variable in LNR2 is on, but not its counterpart in LNR1 is off, during the year that immediately follows. (See Tables 16 and 17.) LNR2 generally increased expression (15) more than LNR1. Presumably these increases were due to the "added effects" of the immediately following years.

FID, in turn, contains LNR2. Each dummy variable in FID is on while its counterpart in LNR2 is on, and, as a rule, the former remains on during successive years when the latter is off. (See Tables 15 and 17.) Thus FID captures the effects on strike activity that each change in labour legislation exerts during, say, the third and fourth years it is in effect, but LNR2 does not capture these effects. These "added" effects presumably caused FID to result in higher values for expression (15) than did LNR2 in unrestricted
regression equations where NS1 and NS3 were the regressants (see Table 21).

4.7 Selected Effects of Changes in Labour Legislation on Strike Activity in British Columbia: 1950-75

Tables 22, 23 and 24 respectively present selected regression results for the dummy variable configurations, FID, LNR1 and LNR2. The latter incorporated the fewest important changes in labour legislation, and they generally had the greatest impact on 1950-75 strike activity in British Columbia as explained above. Tables 22, 23 and 24 include regressions where at least one of the three dummy variable configurations—FID, LNR1 and LNR2—differed statistically from zero at the 10% or lower levels of significance. These are regressions involving NS₁, DUR₁, NS₂, and NS₃ as regressants (see Table 21).

Tables 22-24 also include regressions where NS₁/C, NS₂/X and NS₃/F were the regressants. NS₁/C, NS₂/X and NS₃/F—the regressants suggested by the bargaining theory of Chapter 2—are included, so that regression results involving NS₁, NS₂ and NS₃ respectively. Earlier students of strike activity used absolute measures of strike activity, such as NS₁, NS₂ and NS₃ in their regression analyses of strikes. Finally, regression results with DUR₂ as the regressant are presented in Tables 22, 23 and 24, in order that they can be compared with regression results involving DUR₁ as the regressant.

The directions of impact that individual pieces of legislation had on strike activity (i.e., positive or negative) generally were the same for a given regressant, regardless of the dummy variable scheme (FID, LNR1 or LNR2) that was included in the regression.
<table>
<thead>
<tr>
<th>Regressant</th>
<th>I</th>
<th>$X_1$</th>
<th>$U$</th>
<th>$A$</th>
<th>$P$</th>
<th>$X_5$</th>
<th>$D_{C2}$</th>
<th>$D_{C1}$</th>
<th>$D_{C5}$</th>
<th>$R^2$</th>
<th>DF</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X_5/G$</td>
<td>-31.337</td>
<td>6.376</td>
<td>-0.0006</td>
<td>0.777</td>
<td>0.002</td>
<td>-0.062</td>
<td>1.454</td>
<td>1.127</td>
<td>1.791†</td>
<td>.219</td>
<td>(3,17)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>(-1.625)</td>
<td>(0.924)</td>
<td>(-0.064)</td>
<td>(1.580)</td>
<td>(1.928)</td>
<td>(-0.202)</td>
<td>(1.169)</td>
<td>(1.002)</td>
<td>(1.749)</td>
<td>(1.374)</td>
<td>17</td>
</tr>
<tr>
<td>$T_3$</td>
<td>-206.520†</td>
<td>59.235</td>
<td>-0.028</td>
<td>5.021</td>
<td>0.015***</td>
<td>-0.393</td>
<td>9.590</td>
<td>7.566</td>
<td>11.715***</td>
<td>.550**</td>
<td>(3,17)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>(-1.892)</td>
<td>(1.350)</td>
<td>(-0.498)</td>
<td>(1.833)</td>
<td>(2.506)</td>
<td>(-2.232)</td>
<td>(1.265)</td>
<td>(1.303)</td>
<td>(2.219)</td>
<td>(4.313)</td>
<td>17</td>
</tr>
<tr>
<td>$DUR_1$</td>
<td>-725.650†</td>
<td>461.180</td>
<td>-1.734***</td>
<td>22.761</td>
<td>0.023</td>
<td>-46.569†</td>
<td>-13.666</td>
<td>-16.172</td>
<td>-52.553</td>
<td>.206</td>
<td>(8,17)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>(-0.421)</td>
<td>(0.760)</td>
<td>(-2.140)</td>
<td>(0.527)</td>
<td>(0.215)</td>
<td>(-1.712)</td>
<td>(-0.407)</td>
<td>(-1.964)</td>
<td>(0.631)</td>
<td>(1.002)</td>
<td>17</td>
</tr>
<tr>
<td>$XS_2/G$</td>
<td>7.307</td>
<td>2.176</td>
<td>-0.0002</td>
<td>-0.101</td>
<td>0.0003</td>
<td>-0.037</td>
<td>0.365</td>
<td>0.327</td>
<td>0.246</td>
<td>.743*</td>
<td>(8,17)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>(0.777)</td>
<td>(1.295)</td>
<td>(-0.007)</td>
<td>(-0.846)</td>
<td>(1.195)</td>
<td>(-0.501)</td>
<td>(1.194)</td>
<td>(1.067)</td>
<td>(10.019)</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>$X_2$</td>
<td>87.703</td>
<td>145.760</td>
<td>-0.002</td>
<td>-2.184</td>
<td>0.027</td>
<td>-2.579</td>
<td>1.391</td>
<td>-0.215</td>
<td>5.829</td>
<td>.790*</td>
<td>(8,17)</td>
</tr>
<tr>
<td>[1953-75]</td>
<td>(0.216)</td>
<td>(1.021)</td>
<td>(-0.009)</td>
<td>(-0.215)</td>
<td>(1.138)</td>
<td>(-0.410)</td>
<td>(0.049)</td>
<td>(-0.009)</td>
<td>(0.297)</td>
<td>(12.730)</td>
<td>17</td>
</tr>
<tr>
<td>$JUR_2$</td>
<td>-1779.200</td>
<td>279.490</td>
<td>0.017</td>
<td>46.622</td>
<td>0.041</td>
<td>-25.059</td>
<td>2.818</td>
<td>-16.324</td>
<td>23.030</td>
<td>.016</td>
<td>(3,17)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>(-1.569)</td>
<td>(0.670)</td>
<td>(0.032)</td>
<td>(1.639)</td>
<td>(0.653)</td>
<td>(-1.424)</td>
<td>(0.036)</td>
<td>(-0.251)</td>
<td>(0.420)</td>
<td>(1.050)</td>
<td>17</td>
</tr>
</tbody>
</table>

\[ D_{61} D_{62} \quad R^2 \]

| $X_5/G$ | 1.009 | 15.715*** | -0.007 | - | - | - | - | - | - | - | (4.21) |
| [1950-75] | (0.856) | (2.463) | (-0.604) | - | - | - | - | - | - | - | 21 |
| $T_3$ | -30.068 | 721.730* | -0.165 | - | - | - | - | - | - | - | (4,13) |
| [1953-75] | (-1.301) | (4.509) | (-0.903) | - | - | - | - | - | - | - | 13 |

* Statistically different from zero at the 1% level of significance
** Statistically different from zero at the 5% level of significance
*** Statistically different from zero at the 10% level of significance
† Statistically different from zero at the 0.5% level of significance
‡ Positive coefficient
- Negative coefficient

I Intercept coefficient

$R^2$ Adjusted $R^2$

DF Degrees of freedom: (a,b) for F-test, B for t-test.

( ) T-statistics for regression variable coefficients: F-statistics for $R^2$

a only the t-test for A=0 is one-tailed; all others are two-tailed
### Table 23

Selected Regression Results Involving Learning New Rules in One Year: 1950-75 or 1953-75 Annual

<table>
<thead>
<tr>
<th>Regressant</th>
<th>$I$</th>
<th>$X_1$</th>
<th>$U$</th>
<th>$A$</th>
<th>$P$</th>
<th>$X_5$</th>
<th>$D_{P1}$</th>
<th>$D_{P2}$</th>
<th>$D_{P3}$</th>
<th>$D_{P4}$</th>
<th>$R^2$</th>
<th>DF</th>
</tr>
</thead>
<tbody>
<tr>
<td>$NS/C$</td>
<td>-3.582</td>
<td>-2.904</td>
<td>0.003</td>
<td>0.100</td>
<td>0.001</td>
<td>-0.018</td>
<td>-0.727</td>
<td>0.186</td>
<td>-0.594</td>
<td>0.151</td>
<td>0.112</td>
<td>(9, 16)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>-0.319</td>
<td>-0.480</td>
<td>0.341</td>
<td>0.349</td>
<td>1.521</td>
<td>-0.058</td>
<td>-1.337</td>
<td>0.342</td>
<td>-0.968</td>
<td>0.213</td>
<td>1.349</td>
<td>16</td>
</tr>
<tr>
<td>$NS_1$</td>
<td>1.597</td>
<td>-11.108</td>
<td>0.014</td>
<td>-0.0005</td>
<td>0.006</td>
<td>-0.036</td>
<td>-4.037</td>
<td>1.214</td>
<td>-3.253</td>
<td>3.491</td>
<td>0.645**</td>
<td>(9, 16)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>0.025</td>
<td>-0.317</td>
<td>0.269</td>
<td>-0.003</td>
<td>1.795</td>
<td>-0.021</td>
<td>-1.280</td>
<td>0.385</td>
<td>-0.915</td>
<td>0.849</td>
<td>3.236</td>
<td>16</td>
</tr>
<tr>
<td>$DUR_1$</td>
<td>332.280</td>
<td>-80.943</td>
<td>-1.170</td>
<td>11.190</td>
<td>0.060</td>
<td>-37.173</td>
<td>-70.395</td>
<td>103.270***</td>
<td>-15.867</td>
<td>-31.355</td>
<td>0.283</td>
<td>(9, 16)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>-0.378</td>
<td>-0.171</td>
<td>-1.648</td>
<td>0.49</td>
<td>1.403</td>
<td>-1.584</td>
<td>-1.652</td>
<td>2.423</td>
<td>-0.330</td>
<td>-0.565</td>
<td>2.098</td>
<td>16</td>
</tr>
<tr>
<td>$NS_2/X$</td>
<td>3.639</td>
<td>2.309</td>
<td>-0.002</td>
<td>-0.087</td>
<td>0.0002$^+$</td>
<td>-0.063</td>
<td>-0.119</td>
<td>-0.043</td>
<td>-0.23***</td>
<td>-0.292***</td>
<td>0.787*</td>
<td>(9, 16)</td>
</tr>
<tr>
<td>$NS_3$</td>
<td>64.780</td>
<td>159.020$^+$</td>
<td>-0.056</td>
<td>-1.671</td>
<td>0.038</td>
<td>-1.065</td>
<td>-4.117</td>
<td>9.658</td>
<td>-18.820***</td>
<td>-33.136*</td>
<td>0.878*</td>
<td>(9, 16)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>0.389</td>
<td>1.772</td>
<td>-0.415</td>
<td>-0.394</td>
<td>4.741</td>
<td>-0.240</td>
<td>-0.510</td>
<td>-1.197</td>
<td>-2.070</td>
<td>-3.153</td>
<td>20.934</td>
<td>16</td>
</tr>
<tr>
<td>$DUR_2$</td>
<td>-632.000</td>
<td>12.306</td>
<td>0.275</td>
<td>16.992</td>
<td>0.016</td>
<td>-16.935</td>
<td>-13.923</td>
<td>-1.747</td>
<td>5.929</td>
<td>-4.043</td>
<td>0.000</td>
<td>(9, 16)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>-0.966</td>
<td>0.035</td>
<td>0.520</td>
<td>1.018</td>
<td>0.501</td>
<td>-0.969</td>
<td>0.439</td>
<td>-0.055</td>
<td>0.166</td>
<td>-0.098</td>
<td>0.669</td>
<td>16</td>
</tr>
</tbody>
</table>

| $NS_2/F$   | 0.574 | 15.906*** | -0.0002 | 0.307 | -0.533 | 0.352 | -0.408 | 0.229$^+$ | (6, 19) |
| [1950-75]  | 0.889 | 2.354 | -0.015 | 0.383 | -0.702 | 0.364 | -0.413 | 2.239 | 19 |
| $NS_3$     | 7.450 | 735.520$^*$ | -0.106 | 5.090 | -9.632 | -33.592* | -47.952*** | -47.952*** | 5.513 | 16 |
| [1953-75]  | 0.679 | 4.648 | -0.572 | 0.391 | -0.788 | -1.754 | -2.584 | 5.513 | 16 |

* Statistically different from zero at the .1% level of significance.
** Statistically different from zero at the 1% level of significance.
*** Statistically different from zero at the 5% level of significance.
† Statistically different from zero at the 10% level of significance.

$R^2$: Adjusted $R^2$

DF Degrees of Freedom: (a, b) for F-test, b for t-test

( ) T-statistics for regression variable coefficients; F-statistics for $R^2$

$D_{P1}$ Mediation Commission Act
$D_{P2}$ Mediation Services Act
$D_{P3}$ Labour Code of British Columbia
$D_{P4}$ Labour Code of British Columbia Amendment Act, 1975
$D_{P5}$ Labour Code of British Columbia Amendment Act, 1975

Only the t-test for $A<0$ is one-tailed; all others are two-tailed.
<table>
<thead>
<tr>
<th>Regressant</th>
<th>I</th>
<th>X1</th>
<th>U</th>
<th>A</th>
<th>P</th>
<th>X5</th>
<th>H1</th>
<th>H2</th>
<th>D3</th>
<th>R2</th>
<th>DF</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS1/X</td>
<td>-11.192</td>
<td>-3.284</td>
<td>0.001</td>
<td>0.291</td>
<td>0.001</td>
<td>0.313</td>
<td>-0.812</td>
<td>0.593</td>
<td>-0.027</td>
<td>0.234</td>
<td>(3,17)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>(-0.956)</td>
<td>(-0.510)</td>
<td>(0.081)</td>
<td>(0.992)</td>
<td>(1.970)</td>
<td>(1.031)</td>
<td>(-1.792)</td>
<td>(1.577)</td>
<td>(-0.042)</td>
<td>(1.958)</td>
<td>17</td>
</tr>
<tr>
<td>NS2</td>
<td>-56.828</td>
<td>-6.078</td>
<td>-0.123</td>
<td>1.725</td>
<td>-0.009</td>
<td>2.136</td>
<td>-0.156</td>
<td>4.095</td>
<td>-0.636</td>
<td>0.539**</td>
<td>(3,17)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>(-1.002)</td>
<td>(4.0.166)</td>
<td>(-0.261)</td>
<td>(1.020)</td>
<td>(2.736)</td>
<td>(1.231)</td>
<td>(-0.024)</td>
<td>(1.912)</td>
<td>(-0.169)</td>
<td>(4.659)</td>
<td>17</td>
</tr>
<tr>
<td>JUR1</td>
<td>-1195.400</td>
<td>-20.430</td>
<td>-1.516**</td>
<td>32.801</td>
<td>0.110***</td>
<td>-8.653</td>
<td>-63.333</td>
<td>98.057</td>
<td>-55.331</td>
<td>0.470**</td>
<td>(3,17)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>(-0.901)</td>
<td>(-0.068)</td>
<td>(-1.516)</td>
<td>(1.020)</td>
<td>(4.911)</td>
<td>(0.903)</td>
<td>(-0.537)</td>
<td>(2.037)</td>
<td>(-3.190)</td>
<td>(26.125)</td>
<td>17</td>
</tr>
<tr>
<td>NS3/F</td>
<td>2.876</td>
<td>2.253†</td>
<td>-0.002</td>
<td>-0.682</td>
<td>0.0003***</td>
<td>-0.032</td>
<td>-0.053</td>
<td>0.076</td>
<td>-0.242***</td>
<td>0.797*</td>
<td>(3,17)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>(1.232)</td>
<td>(1.809)</td>
<td>(-0.068)</td>
<td>(1.914)</td>
<td>(2.476)</td>
<td>(0.903)</td>
<td>(-0.537)</td>
<td>(2.037)</td>
<td>(-3.190)</td>
<td>(26.125)</td>
<td>17</td>
</tr>
<tr>
<td>NS2</td>
<td>33.733</td>
<td>133.750</td>
<td>-0.038</td>
<td>-0.061</td>
<td>0.040*</td>
<td>0.427</td>
<td>-4.000</td>
<td>11.692†</td>
<td>-2.424*</td>
<td>0.889*</td>
<td>(3,17)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>(2.068)</td>
<td>(1.545)</td>
<td>(-0.763)</td>
<td>(0.909)</td>
<td>(4.911)</td>
<td>(0.903)</td>
<td>(-0.537)</td>
<td>(2.037)</td>
<td>(-3.190)</td>
<td>(26.125)</td>
<td>17</td>
</tr>
<tr>
<td>JUR2</td>
<td>-605.890</td>
<td>6.676</td>
<td>0.350</td>
<td>16.213</td>
<td>0.014</td>
<td>-16.001</td>
<td>2.429</td>
<td>3.007</td>
<td>0.600</td>
<td>(8,17)</td>
<td>(8,17)</td>
</tr>
<tr>
<td>[1950-75]</td>
<td>(-0.924)</td>
<td>(0.019)</td>
<td>(0.671)</td>
<td>(0.963)</td>
<td>(0.426)</td>
<td>(-0.859)</td>
<td>(-0.007)</td>
<td>(0.105)</td>
<td>(0.756)</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>NS3</td>
<td>6.250</td>
<td>729.840***</td>
<td>0.006</td>
<td>0.536</td>
<td>-0.661</td>
<td>-0.135</td>
<td>0.339***</td>
<td>2.930</td>
<td>(5,20)</td>
<td>(5,20)</td>
<td></td>
</tr>
<tr>
<td>[1953-75]</td>
<td>(0.492)</td>
<td>(4.553)</td>
<td>(-0.390)</td>
<td>(0.492)</td>
<td>(4.553)</td>
<td>(-0.390)</td>
<td>(0.492)</td>
<td>(4.553)</td>
<td>(-0.390)</td>
<td>(4.553)</td>
<td>17</td>
</tr>
</tbody>
</table>

* Statistically different from zero at the .1% level of significance
** Statistically different from zero at the 1% level of significance
*** Statistically different from zero at the 5% level of significance
† Statistically different from zero at the 10% level of significance
+ Positive coefficient
- Negative coefficient
I Intercept coefficient

$R^2$ Adjusted $R^2$

DF Degrees of freedom: (a,b) for F-test, b for T-test

( ) T-statistics for regression variables; F-statistic for $R^2$

$\chi^2$ Tests are one-tailed for $A<0$; all others are two-tailed

$\chi^2$ Tests are one-tailed for $A<0$; all others are two-tailed
equation. (See Tables 22-24).

However, there was some switching of the signs of coefficients in at least two unrestricted regression equations where FID and LNR2, in effect, were interchanged and where they differed from zero at the 10% or lower levels of statistical significance. In one case, where $NS_1$ was the regressant, the sign of the dummy variable representing the Labour Relations Act changed from being negative and differing from zero at the 10% level of significance for LNR2 to being positive and, more importantly, not differing statistically from zero at the 10% or lower levels of significance for FID. (See Tables 22 and 24.) In another case, where $NS_3$ was the regressant, the dummy variable representing the Trade-unions Act had a positive coefficient and differed statistically from zero at the 10% level of significance for FID. (See Table 22.) But, it had a negative coefficient and did not differ statistically from zero for LNR2. (See Table 24.) It is quite conceivable, however, that the structural effect of a change in legislation (through FID) would differ from the initial two-year effect of a change in labour legislation (through LNR2), since the former generally involved a longer time period than the latter.

By contrast, the coefficients of dummy variables representing the same labour statute did not change signs in those regressions where LNR1 or LNR2 differed statistically from zero at the 10% or lower levels of significance. The regressants in these cases were $NS_1$, DUR1 and $NS_2$. (See Tables 21, 23 and 24.) In other words, changes in labour legislation had the same direction of impact on strike activity, during the first year or two they were in force.
In general, the labour statutes that embodied the voluntary accommodative approach to labour relations—the Mediation Services Act (MSA) and the Labour Code of British Columbia (LCBC)—were associated with a reduction in strike measures. (See, for example, the coefficients of $D_{p3}$, representing the MSA in Table 23, and coefficients of $D_{p4}$ and $D_{H3}$, representing the LCBC in Tables 23 and 24 respectively.) The coefficients of the dummy variables representing the MSA and LCBC were negative and differed statistically from zero at the 10% or lower levels of significance for the following strike measures: the number of contract renewal strikes ($NS_2$), the ratio of contract renewal strikes to contract expiries ($NS_3/X$) and the number of strikes during the term ($NS_3$). (See Tables 23-24). But, only where the regressant was $NS_2$ did the dummy schemes, LNR1 and LNR2, differ statistically from zero at the 10% or lower levels of significance.\footnote{The MSA and LCBC were submerged in the intercept term in unrestricted regressions including FID. However, LNR1 and LNR2 more than adequately reflect the effects of the MSA and LCBC on strike activity, since the MSA was in force for only one year (1973) and since the LCBC was in force for only two years (1974-75). (See Tables 16-17 above.)} (See Table 21.)

Those statutes that provided for a compulsory, normative, legalistic, or punitive approach to labour relations influenced strike activity both negatively and positively. They included the Industrial Conciliation and Arbitration Act (ICAA), the Labour Relations Act (LRA), the Mediation Commission Act (MCA) and the Trade-unions Act (TUA).

We shall restrict ourselves below to discussing those effects of these statutes on strike activity (1) which differed statistically from zero and (2) which were a part of dummy variable schemes that differed
statistically from zero, at the 10% or lower levels of significance.

The LRA and ICAA had negative structural effects on the duration of contract renewal strikes (DUR2). (See Tables 21-22.) During the first two years that the LRA was in force, it exerted a negative influence on the number of first agreement strikes (NS₁) and the duration of first agreement strikes (DUR₁). (See Tables 21 and 24.)

The MCA and TUA, both of which were very controversial statutes and both of which organized labour in British Columbia represented, tended to exert a negative influence on strike activity. The MCA, for example, influenced positively (1) the duration of first agreement strikes (DUR₁) during both the first year and the first two years it was in force and (2) the number of contract renewal strikes (NS₂) during the first two years it was in force. (See Tables 21, 22 and 23.) The MCA had a positive structural influence on the number of first agreement strikes (NS₁), as well. (See Tables 21-22.) The structural impact of the TUA (and the LRA) on the number of wildcat strikes (NS₃) also was positive.

The coefficients of regressors in unrestricted regressions involving NS₁/C, NS₂/X and NS₃/F generally had the same sign as their counterparts in regressions involving NS₁, NS₂ and NS₃. (See Tables 22-24.) However, substitution of NS₁/C, NS₂/X and NS₃/F for NS₁, NS₂ and NS₃ in unrestricted regression equations involving FID, LNR1 and LNR2, etc. par., dampened the impact of FID, LNR1 and LNR2 on strike

---

40 See Tsong (1971) concerning the MCA and see Jamieson (1973) concerning both the MCA and the TUA.
activity. In particular it lowered the value of expression (15) for FID, LNR1 and LNR2 (see Table 21). Perhaps, more importantly, it caused the statistically significant results involving FID (for $NS_1$), LNR1 (for $NS_2$) and LNR2 (for $NS_2$ and $NS_1$) to become statistically insignificant for $NS_1/C$ and $NS_2/X$. (See Table 21.)

Curiously, fewest important changes in labour legislation, as well as changes in economic and socio-economic variables, apparently affected the duration of first agreement strikes ($DUR_1$) but not the duration of contract renewal strikes ($DUR_2$). (See Tables 22-24.) Perhaps economic variables in particular exerted a greater influence on $DUR_1$ than on $DUR_2$ because the average length of first agreement strikes is almost double the length of contract renewal strikes, thereby providing more time for labour and management to respond to economic pressure. (See Table 1 above.)

One of the fewest important changes in labour legislation which may have affected $DUR_1$ was the provision for first agreement arbitration, which was first incorporated into the labour statutes of British Columbia in 1974. First agreement arbitration had a negative, but statistically insignificant influence on strike activity during the first year, as well as during the first two years it was in force. (See Tables 23-24.) However, the dummy variable schemes which modelled the effects of the first year and the first two years of first agreement arbitration on $DUR_2$--LNR1 and LNR2--differed statistically from zero at the 10% or lower levels of significance.
4.8 Comments and Extensions

The validity of the results that were presented above depends on the extent to which, for example, (1) autocorrelation was present among the regression estimates, (2) the regression estimates were correctly specified and (3) there were errors in variables. No statistically significant evidence of autocorrelation was found. The regression estimates included most, if not all, of the factors that other students of strike activity considered (or found out were) economically important determinants of strike activity, as explained above.41 As long as any errors in the strike measures, S, were of a random nature, uncorrelated with each other and not biased, confidence can be placed in the results that were obtained. However, measurement errors in the regressors would distort the results that were obtained. (See Neter and Wasserman, 1974, 167-169.) The current study was extended by testing for the effects of slope-shifting dummy variables on strike activity in regression estimates that used quarterly data. None of the slope-shifting dummy variable configurations contributed a statistically significant increase to the differential in $R^2$ between the unrestricted and the restricted regression estimates.

---

41 Both Vanderkamp (1970) and Walsh (1975) tested the hypothesis that labour relationships mature over time and, furthermore, that the maturation of bargaining relationships would result in fewer strikes taking place. They tested this hypothesis by using a time trend as a regressor in their regression specifications.
4.9 Conclusions

Two regression equations were suggested by two theories of strike activity, one a model of interest dispute strikes and the other a model of strikes during the term. The economic determinants contained in the two regression equations included most, if not all, of the economic determinants of strike activity that were suggested in previous studies of strike activity. Indeed, the interest dispute strikes specification included one variable, the average age of the non-agricultural work force, which Jamieson (1968) and Walsh (1975) speculated was an important determinant of strike activity.

An economic determinant, the percentage increase in the consumer price index \( \frac{\Delta CPI_t}{CPI_{t-1}} \), was added to the economic determinant that Rees thought to influence strikes during the term: the unemployment rate. The percentage change in the consumer price index was intended to capture the contribution that perceived erosions in employees' expected economic standards make towards precipitating wildcat strikes.

It is of economic significance that \( \frac{\Delta CPI_t}{CPI_{t-1}} \) had a coefficient which meant that it was associated with an increase in strike activity during the term and which was statistically different from zero. Generally speaking, the remainder of the economic determinants had coefficients whose signs were as other students of Canadian strike activity had expected—particularly the signs of those economic determinants that statistically differed from zero.

Perhaps the most important economic result was that the regression equation that was suggested by the bargaining theory of
Chapter 2 explained more than 80% of the variation of $NS_2/X$, the ratio of the number of contract renewal strikes to contract expiries (lagged three months). Its explanatory power was considerably less for $NS_1/C$, the ratio of the number of first agreement strikes to first certificates issued. (See Table 14 above.) An explanation for this probably is the extent to which non-economic issues, including precedent-setting issues, were involved in first agreement, as opposed to contract renewal negotiations and strikes. (See, for example, Walsh, 1975, 48.)

Our empirical findings corroborate the findings of other researchers, including Walsh, concerning the relationship between strike activity and economic activity. Walsh, for instance, also found that higher $R^2$ were obtained for incidence measures than for duration measures of strike activity in regression analysis of strike activity (1975, 46-48).

A key contribution of the current study stems from the fact that strike activity was classified according to contract status. Using the $R^2$ of regression lines that statistically differed from zero as the criterion, the explanatory power of the regression lines was as follows: highest for contract renewal strikes, second-highest for first agreement strikes and lowest for strikes during the term (see Table 14.) A relatively high presence of non-economic issues in strikes during the term may explain why regression lines involving strikes during the term had such a relatively low explanatory power.  

See, for instance, Walsh, 1975, 48, and Tables 14, 20 and 21 above.
Our empirical findings resemble those of Ashenfelter and Johnson, who studied the effects of changes in United States labour legislation on strike activity. A-J found that changes in labour legislation had a statistically significant impact on the level of strike activity in the United States (1967, 47). We found that changes in British Columbia's labour legislation had some statistically significant effects on strike activity in British Columbia during 1950-75.

Changes in British Columbia 1950-75 labour legislation were organized into several categories. The category that involved the "fewest important changes" (FIC) in labour legislation had the greatest impact on strike activity. FIC influenced strike activity both structurally (i.e., during the time period from when each statute in FIC was in force until it was amended significantly or repealed and replaced by another statute in FIC) and briefly (i.e., during the initial year or initial two years that each of the fewest important changes in British Columbia's legislation was in effect). In general, FIC seemed to influence strike activity most during the first two years that they were in force.

The results of this study tend to support the hypothesis that reductions in the level of strike activity generally were associated with the general shift in public policy that took place in British Columbia during 1945-75. Unfortunately, statistically significant reductions in the level of strike activity were not obtained for the strike measure that is theoretically most appealing.
the incidence measure of strike activity. The general shift in public policy involved replacing compulsory, adjudicative, legalistic, and punitive modes of dispute resolution with voluntary and accommodative modes of dispute resolution which were backed by the threat of adjudication and punitive measures. Such a shift in public policy was suggested by the Prime Minister's Task Force on Labour Relations in 1968. (See Woods et al. 1969.) It was partially implemented in British Columbia in late 1972 when the Mediation Services Act was enacted. The voluntary accommodative approach to labour relations was enshrined in the Labour Code of British Columbia, which was enacted in late 1973. (See, for example, Arthurs 1975.) It should be noted that our study covers only three years during which the voluntary, accommodative approach to labour relations was used.

Of course, our findings concerning the statutory change-strike activity relationships are merely indicative of the possible direction of influence. Regression relationships are not causal relationships. Moreover, one particular reduction in strike activity may have been due in large part to a factor other than a legislative change. This is the 1974-75 reduction in the incidence of strikes during the term. It may have come about solely because labour and management officials in the forest products industry made a concerted effort to reduce the incidence of wildcat strikes in their industry. The forest products industry was the major contributor of wildcat strikes in British Columbia, particularly during the 1970s. (See pp. 106 and 110 above.)
In conclusion, it was inferred from regression analysis that changes in labour legislation did have some statistically significant effects on strike activity in British Columbia from 1950 through 1975.
BIBLIOGRAPHY

1. Books and Articles


Commerce Clearing House Canadian Limited. Canadian Labour Law Cases (Don Mills).


Industrial Relations Institute, Queen's University, *Labour Law Cases* (Kingston).


______. (1968). Labour Arbitration and Industrial Change, Task Force on Labour Relations Study No. 6 (Ottawa: Queen's Printer).


2. Statistical Sources

British Columbia Department of Labour, Annual Report (Victoria).


Statistics Canada, Canadian Statistical Review (Ottawa, monthly).

Statistics Canada (71-201), Historical Labour Force Statistics (Ottawa).

Statistics Canada (71-001), The Labour Force (Ottawa, monthly).

Statistics Canada (62-002), Prices and Price Indexes (Ottawa, monthly).
3. Letters


APPENDIX A

A REVIEW OF STRIKE-AS-AN-INVESTMENT BARGAINING THEORIES

The strike-as-an-investment theories that we shall review in this appendix include those of Ashenfelter and Johnson (1969), Eaton (1972), Heiser (1970), Johnston (1972a), Kraus and Melnik (1972), Trifin and Landau (1974), and Rabinovitch and Swary (1976). (The theories that involve joint authors will be denoted by the first letters of each author's name, such as by A-J for Ashenfelter and Johnson.) We shall commence our review with the A-J theory, which was one of the first, if not the first, bargaining theories to model the strike-as-an-investment since Hicks' theory.

Decision makers in strike-as-an-investment bargaining theories, the firm and the union, are return- or gain-maximizers. They view the strike as a possible means for investing in future returns which exceed the returns that they might have achieved in the absence of a strike during the current round of contract negotiations or renegotiations. The firm and the union respectively consider foregoing profits or wage earnings during a strike in order to achieve (or invest in) a relative increase in future

---

1See Hicks, 1966, 136-158, published originally in 1932. A presentation and critique of Hicks' theory and many others is found in Fisher (1976), 1-54.
profits or earnings. Strike-as-an-investment bargaining theories isolate the role that the strike, or the threat of a strike, plays in collective bargaining. Because strikes impose costs on both labour and management, they presumably induce labour and management to make concessions and impel them towards a negotiated settlement.

A.1 The Ashenfelter and Johnson Theory

The firm in Ashenfelter and Johnson's theory maximizes its net worth, subject to a union concession curve that the employer knows with certainty:

\[
\begin{align*}
\text{MAXIMIZE} & \quad NW = \int_{s}^{\infty} (pQ - w_{s}L - H)e^{-rt}dt - \int_{0}^{s} He^{-rt}dt \\
\text{SUBJECT TO} & \quad w_{s} = c(s) ; \quad c' < 0 .
\end{align*}
\]

The left-hand integral in equation (1) represents the firm's discounted present value which extends from the time the strike ends, \(s\), over the firm's expected lifetime, which is infinite. The term, \((pQ - w_{s}L - H)\), represents profits where \(p\), \(Q\), \(w_{s}\), \(L\), and \(H\), respectively, represent price, output, the post-strike wage rate, the number of employees, and the opportunity costs of the firm's capital.\(^2\)

\(^2\)Fringe benefits and the money equivalent of working conditions are included in the wages, \(w\), that appear in this thesis.
The discount rate, $r$, is the firm's internal rate of discount. It, therefore, either exceeds or equals the current rate of interest in the capital market. The right-hand integral in (1) stands for *a priori* uncovered fixed costs: the overhead costs that the firm expects to fail to cover during the strike of duration, $s$, once that strike takes place. It is important to notice that once a strike commences, any *a posteriori* uncovered fixed costs are bygones; as sunk costs, they should not enter the term for *a priori* uncovered fixed costs that appears on the right-hand side of (1).\footnote{See Hicks, 1966, 145.}

Equation (2), the union's wage concession path, relates inversely the expected duration of the strike. A-J conceive of (2) with the wage offers that the union will make during a strike, as a wage decay function which is "similar to, but by no means identical, to Hicks' union 'resistance curve.'"\footnote{See A-J, 1969, 37, n. 10 and Hicks, 1966, 143.}

A-J in effect assume that the union determines the wage concessions path that it will follow during both pre- and post-strike negotiations *before* it reaches the bargaining table. They also in effect assume that the firm is a perfect mindreader of the union but that the converse does not obtain. In the event of a strike, the union apparently will blindly follow its wage con-
cession path and continually announce its latest wage offer. This means that the firm need only wait during a strike and accept the union wage offer that maximizes the firm's net worth. But, to spare the union (and the employer) the needless costs of a strike, the employer will announce during pre-strike negotiations the post-strike wage rate, \( w^* \), that the employer will accept, should a strike ensue. The union, which is extremely docile in the A-J theory, will settle for \( w^* \) and no strike will take place. In the final analysis, collective bargaining in the A-J theory is tantamount to employer Boulwarism.\(^5\)

The procedure for solving the system of equations (1) and (2) is quite straightforward. The firm substitutes \( c(s) \) from (2) for \( w_s \) in (1), integrates and then differentiates with respect to \( s \). This determines the optimal strike length, \( s^* \). Substitution of the value of \( s^* \) into (2) yields \( w^* \). However, if the first and second order conditions for a maximum are not met, the firm will be best off it it negotiates a wage settlement.\(^6\)

A.2 The Eaton Theory

Eaton conceives that the individual employee is involved in a ratification vote of a particular kind. The employer has made the latest wage offer, and the union faces a strike deadline which precludes it from making a counter-offer. Each employee has an objective function

\(^5\)Boulwarism, which is take-it-or-leave-it bargaining from the outset of negotiations, is considered an unfair labour practice, bargaining in "bad faith," in the United States and, to a less explicit degree, in Canada. See Sloane and Whitney, 1972, 38-39.

that he uses to decide whether or not to accept the employer's last wage offer.

The union member compares the benefits that he would derive from accepting the employer's last wage offer with the benefits that he would derive from rejecting it, striking and achieving a strike-induced wage settlement. Although the employee in Eaton's theory calculates these benefits by summing over discrete time intervals, these benefits will be presented below in an integral format. The two benefits are certain returns, \( CR_u \), and strike-related returns, \( SR_u \):

\[
CR_u = \int_0^\infty w^* e^{-i^* t} \, dt; \quad i^* = \left( \frac{r + T}{1 - T} \right)
\]

in discrete time,

\[
SR_u = \int_s^\infty w^* e^{-i^* t} \, dt + AI + SF + RP
\]

where \( \lambda \) is the employee's retirement date, \( i^* \) is the employee's internal rate of discount and \( T \) is the "disengagement coefficient." The discount rate, \( i^* \), is the continuous time equivalent to \( i \) from Eaton's discrete time framework.\(^7\) The "disengagement coefficient,"

\[\text{More specifically, the employee in Eaton's theory discounted his future wage bill during the (t+1)th discrete time period by } \left( \frac{1+T}{1+r} \right)^t. \text{ The term, } \left( \frac{1-T}{1+r} \right), \text{ converts into } \left( \frac{1}{1+i} \right) \text{ as follows:}
\]

\[
\left( \frac{1-T}{1+r} \right) = \left( \frac{1+r}{1-T} \right) = \frac{1}{(1-T)+(r+T)} = \frac{1}{(1+i)}
\]
T, represents the probability that the employee will be terminated either voluntarily or involuntarily in future. In theory, the level of the negotiated wage settlement will have an ambiguous effect on T. The turnover rate is the logical proxy variable for T in an empirical analysis (Eaton, 1972, 676). The terms, AI, SF and RP, respectively, represent the alternative income, strike funds and retroactive pay that the employee expects to receive during the strike.

\( CR_u \) is the present value of the wage bill that the employee expects to earn until retirement, should he accept the employer's latest wage offer, \( w_f \). The component of \( SR_u \) that Eaton isolates in his analysis is the integral term. This term represents the present value of the expected strike-induced wage settlement, \( w_s \), calculated over the employee's expected earning span from the date when the strike is expected to end, \( s \). The three remaining strike-related costs, AI, SF and RP, were held constant, to simplify the analysis.

To determine his vote, the employee calculates what Eaton terms net benefits, NB:

\[
8 \text{ The higher is the negotiated wage rate, the greater is the probability that the employee will remain with the firm, everything else the same. However, the higher the wage settlement, the greater the employer's propensity to substitute capital for labour. See Eaton, 1972, 672.} \\
9 \text{ Strictly speaking, it is the union, rather that the individual employee, that accepts } w_f. \text{ However, the decision framework in Eaton's theory is the microeconomic framework of the individual employee.} \\
10 \text{ The strike-induced wage rate, } w_s, \text{ is defined below.}
\[ NB = SR_u - CR_u \]
\[ = \int_{0}^{q} (w_s - w_f)e^{-i*t} dt - \int_{0}^{s} w_f e^{-i*t} dt + AI + SF + RP . \]

(3)

The left-hand integral term represents the present value of the strike-induced wage differential, \((w_s - w_f)\), which is summed from the end of the strike until retirement. The right-hand integral term represents the opportunity costs of the strike to the employee or, more specifically, the present value of the earnings that the employee would forego, by rejecting \(w_f\) and by striking for a duration, \(s\). The employee votes "yes," if net benefits are positive and "no," if they are non-positive.

Perhaps, the most significant contribution of the Eaton model to bargaining theory is that individual's objective functions are aggregated through a voting procedure, specifically the ratification/strike vote.\(^{11}\) Eaton also added the concept of "wage paths" to the literature of strike-as-an-investment bargaining theories (1972, 672-74). "Wage paths" are wage horizons that the employee expects that wages will take on in future: they are step-functions which may remain constant, increase monotonically or decrease monotonically over future contract periods or "contract years."

\(^{11}\) In testing whether or not benefits were positive for twenty Vancouver area strikes Eaton found support for the proposition that strikes are, indeed, profitable ventures (1972, 675-79).
As Eaton noted (1972, 673), wage paths could be used to implement theoretically the notion that current strikes will induce an employer (a union) to make wage concessions during future rounds of negotiations that exceed (are less than) what the union (employer) might have settled for in the absence of a strike now. The strike-related wage rate, $w_s$, could be transformed into a step function, and it could be compared with a wage path of wage settlements that the decision-maker in the A-J or Eaton theories expected to achieve in the absence of strike activity during current negotiations.

The Eaton theory can also be interpreted as "the missing half of the rather cynical treatment of the strike by Orley Ashenfelter and George Johnson" (1972, 674-75). This interpretation requires that the assumptions that applied to A-J's firm and union be reversed and that a Hicksian employer "concession curve," such as the one presented in Equation (4) below, replace (2):

$$w_s = g(s); \quad g' > 0 \quad \ldots \ldots (4)$$

12 This notion is equivalent to what Hicks calls "not allowing your weapons to rust" (1966, 146). It also constitutes one way of maintaining the (future) credibility of your threats (to strike). (See, for example, Schelling (1956).)

13 Formally, the step function for $w_s$ would be $W_s = (w_{s1}, w_{s2}, \ldots, w_{sj}, \ldots)$ where $w_{sj}$ corresponded to the $i$th contract period and where, for instance, $w_{sj} > w_s(i-1)$. Let $W_n = (w_{n1}, w_{n2}, \ldots, w_{ni}, \ldots)$ be the wage path of expected wage settlements, assuming current negotiations are not resolved through strike activity. Then $(W_s - W_n)$ would replace $(w_s - w_f)$ or $(w_s - w_n)$ in (3) and (1) respectively, and integrals would be segmented according to contract periods.
The procedure for solving the system of equations (3) and (4), is identical to the procedure for solving the A-J model. As such, it constitutes a model of union Boulwarism. Eaton does not spell out the dynamics of the system of equations (1), (2), (3) and (4). Consequently, the Eaton model does not necessarily predict that strikes will occur. It is noteworthy that T-L (1974) and R-S (1976) later analyzed the dynamics of collective bargaining in two-sided theories similar to the one Eaton proposed.

A.3 The Heiser Theory

Heiser explicitly combined an Eaton-like union decision framework with an A-J-like employer decision framework. Heiser's bargaining model is particularly important, because the Johnston theory and the R-S theory, which is the most recent strike-as-an-investment bargaining theory, are built upon Heiser's theory.

Heiser's theory is comprised of a firm which is a monopolist and which seeks to minimize the costs that are associated with collective bargaining, and of a union which seeks to maximize its wage bill through collective bargaining.

1. Heiser makes three assumptions so that he can introduce the wage-employment trade-off into his analysis. They are (i) that the firm is fully integrated and, therefore, produces all its own materials, (ii) that average prime-costs equal marginal labour costs and (iii) that the firm's marginal revenue curve (i.e., its demand for labour curve) is linear. Variable costs are wage costs due to assumption (i).
Assumption (ii) means that labour units, L, and output units, Q, can be used interchangeably, provided that they are measured in appropriate units. Because of assumption (iii), the arc elasticity of demand can be used to approximate the point elasticity of demand.

Assumptions (i), (ii), and (iii), coupled with the assumption that the firm is a monopolist, imply that the following results obtain:

\[ \Delta(wL) = \Delta(wL) = \Delta w \cdot L + w \cdot \Delta L = L \Delta w (1 - \eta) \] ...

or

\[ \Delta_{ms}(wQ) = Q_m(w_s - w_m)(1 - \eta_{ms}) \] ...

and

\[ (pQ - wL) = Q(p - w) = Qw/(\varepsilon - 1) \] ...

or

\[ Q(p - w_m) = Qw_m/(\varepsilon_m - 1) \] ...

where \( \eta \) is the arc elasticity of the firm's marginal revenue curve, \( \eta_{ms} \) is the arc elasticity of demand that corresponds to the wages, \( w_m \) and \( w_s \), and \( \varepsilon(\varepsilon_m) \) is the elasticity of the monopolist's demand curve at \( w \) (at \( w_m \)).

Equation (5) indicates the manner in which

---

14 In other words, \( bL = Q \), where \( b \) is a constant. See Heiser, 1970, 60.

15 See Heiser, 1970, 63, Equation (3) and 65, Equations (7) and (8), respectively.
a change in the wage bill, $\Delta(wQ)$ is related to the wage-employment trade-off, which enters (5) through $\eta$. Equation (6) depicts the relationship between the firm's total revenues net of prime costs, $(pQ - wL)$ and the wage-employment trade-off, which enters (6) through $\varepsilon$.

2. The union's objective function consists of two main components. They are the cost of strike action, $L_0$, and the gains from a strike-induced wage increase, $G$:

$$L_0 = sQw + Q \cdot U(s)$$

and

$$G = \Delta(wQ) V_m(j)$$

$$= Q\Delta w(1 - \eta) V_m(j), \text{ upon substitution of (5),}$$

where $U(s)$ is a so-called supplementary function and $V_m(j)$ is "the sum of unity over $m$ periods, discounted at the rate $j$ (Heiser, 1970, 64)." The term, $sQw$, in $L_0$ is the wage bill, $Qw$, that the union foregoes during a strike of duration, $s$. Heiser motivates and explains the supplementary function, $U(s)$ as follows (1970, 62):

"... As a strike continues, however, the position of those involved must progressively worsen. Worker's savings dry up, strike funds tend to exhaustion, credit becomes increasingly difficult. All these factors may be best thought of as increasing the marginal utility of money, as workers' resources become more and more stretched."
The union's gain, $G$, consists of the increase in the wage bill that the union receives in each period, as given by either (5) or (5'), summed and discounted at the rate $j$ over $m$ periods.

The firm seeks to minimize costs. Its costs consist of the loss of profits from a strike, $L_1$, and the loss of profits from a wage increase, $L_2$:

$$L_1 = sQ(p - w) + Q \cdot F(s,w)$$

$$= sQw/(e - 1) + Q \cdot F(s,w), \text{ upon substitution of (6)},$$

and

$$L_2 = Q\Delta wV_n(i)$$

where $F(s,w)$ is a so-called supplementary function and $V_n(i)$ represents "the present value of a stream of unit payments over $n$ periods, discounted at the rate $i$ (Heiser, 1970, 65)." The term, $sQw/(e - 1)$, in $L_1$ is the "direct profit loss" from a strike of duration, $s$. Heiser motivates the presence of the supplementary function, $F(s,w)$, as follows (1970, 65):

First, an interruption of supplies to customers, or failure to meet contract deadlines, may involve the firm in substantial damage. The monopolist could even be faced with a permanent switch to substitutes. Generally, we may sum up the whole battery of possible injury of this kind as loss of goodwill.

Secondly, a protracted strike may involve the firm in financial stringency, or in liquidity crisis, as fixed expenditures are met while no revenue flows in.
The loss, \( L_2 \), is composed of the increased costs to the firm of a wage increase per period, \( Q\Delta w \), summed and discounted at the rate \( j \) over \( m \) periods.

The two summations, \( V_m(j) \) and \( V_n(i) \) in \( G \) and \( L \) respectively, are the source of the notational difficulty. This difficulty can, perhaps, be best illustrated by comparing the net benefits, \( NB' \), which an employee presumably will seek to maximize in Heiser's theory and which are calculated over discrete time periods, with the integral expression for \( NB \) from Eaton's theory.

\[
NB' = G - L_0
\]

\[
= Q\Delta w (1 - \eta) \sum_{h=1}^{m} \frac{1}{(1 + j)^h} - sQw - Q \cdot U(s) \ldots (7)
\]

By setting \( \eta \) equal to zero, \( Q \) equal to 1 and \( U(s) \) equal to zero, we can derive an \( NB' \) for the individual employee which is equivalent to \( NB \) from Eaton's theory which is:

\[
NB' = (w_s - w_m) \sum_{h=1}^{m} \frac{1}{(1 + j)^h} - s w_s; \quad j = i \text{ in note 7 above,}
\]

\[
\Delta w = (w_s - w_m). \ldots (8)
\]

---

16 Heiser measures the strike-induced wage settlement relative to the employee's opportunity cost (1970, 60). It is assumed that the market wage rate, \( w_m \), is the employees' opportunity cost. This assumption enables us to maintain a notational consistency between Heiser's theory and those of Johnston and R-S. See R-S, 1976, 670-71, note 2.
The summation that stands for \( V_m(j) \) in (8), \( \sum_{h=1}^{m} \frac{1}{1 + j^h} \), does not change in value as the strike length, \( s \), changes, but the integral equivalent to this summation from (3), \( T_1 \), diminishes in value as \( s \) increases, for

\[
T_1 = \int_{s}^{\ell} e^{-i*t} \, dt = e^{-i*s} - e^{-i*\ell} . \quad \ldots \ldots \quad (9)
\]

Similarly, \( V_n(i) \) in \( L_2 \) is not conditional upon the strike length, \( s \), whereas the integral equivalent from (1), \( T_2 \), is conditional upon \( s \), since

\[
T_2 = \int_{s}^{\infty} e^{-r*t} \, dt = e^{-r*s} . \quad \ldots \ldots \quad (10)
\]

At the conceptual level, the fact that \( V_m(j) \) and \( V_n(i) \) do not depend upon \( s \) implies that the firm will pay the union the strike-induced wage rate, \( w_s \), retroactive to the very date that the strike began.\(^{17}\) By contrast, the presence of \( T_2 \) in (1) and of \( T_1 \) in (3) means that the firm in the A-J theory does not begin to pay the wage rate \( w_s \), and that the union in the integral equivalent to Eaton's theory does not begin to receive the wage rate, \( w_s \), until the strike has ended.

The interpretation that stems from the integral framework certainly seems more credible than the interpretation from Heiser's summation framework, concerning the payment of the wage rate, \( w_s \). A cost-minimizing firm like the firm in Heiser's theory presumably

---

\(^{17}\) Heiser's definitions of \( V_m(j) \) and of \( V_n(j) \) were quoted above where \( G \) and \( L_2 \) respectively were presented.
will strongly resist making the full retroactive wage payment that Heiser's theory implies it will make. Indeed, we observe during actual negotiations that the strike-induced wage settlement, $w_s$, normally is paid from the date that the strike ended rather than from the date that the previous contract expired. Retroactive payments typically only partially replace the earnings that the employee had foregone during the work stoppage. If, as Heiser's theory implies, all firms paid the wage rate, $w_s$, retroactive to the date when the contract expired, strikes would be no-loss ventures for unions. Only firms would incur losses through strike action. Moreover, unions presumably would either threaten to or actually would conduct strike action during practically every round of contract negotiations. But we generally do not observe such a universal use of the strike threat or of strike action. The reason is mainly that strikes do impose costs on both parties and that labour and management often are reluctant to "spend their one bullet": either the economic sanction or often the threat thereof. In the final analysis, the summation framework of Heiser's theory severely limits the realism of Heiser's theory.

3. The conceptual shortcoming concerning the payment of the strike-induced wage settlement, $w_s$, which is a part of Heiser's summation framework, carries over into Johnston's theory and into the R-S theory, for these theorists incorporated Heiser's
discrete time framework into their theories. This conceptual shortcoming affected the analyses of collective bargaining that these theorists carried out.

The basic difficulties in their analyses are that, if both $F(s,w)$ in $L_1$ and $U(s)$ in (7) equal zero, the union's objective function, (7), and the firm's cost functions, $L_1$ and $L_2$, become linear functions of $s$ and a corner solution results. This result caused Heiser, for instance, to artificially impose a solution. Heiser's solution was that the union's indifference curve, $N_B' = 0$, will coincide with the firm's "break-even curve," where $L_1$ equals $L_2$ (1970, 66).  

Johnston as well as R-S abstracted from the situation where $N_B'$, $L_1$ and $L_2$ were linear in $s$, and they, in turn, built increasing costs of a strike into their theories, in order to generate optimizing behaviour by the decision-makers in their models. Specifically, Johnston assumed that $F(s,w) = bs^2$ and R-S assumed that $U(s) = K(s) = \lambda s^2$, where $b$ and $\lambda$ were constants. Their analyses

---

Heiser assumed that $V_m(j)$ and $V_n(i)$ were the same. He then used a Hicksian argument that, if the union could "outlast"—that is, strike longer than the firm at any given wage rate,—then the employer would increase his wage offer. (See Hicks, 1966, 146-57 and Heiser, 1970, 66-67). The employer's raising his wage offer would narrow the length of time in which the union could outlast the firm. Unfortunately, Heiser, unlike Hicks (1966, 144 and 146-47), for example, did not discuss the role that either the interchange of information or the strike threat plays in collective bargaining. Heiser also failed to explain what would happen if the employer could outlast the union. It consequently, is not clear from Heiser's analysis that it is in the best interests of labour and management that their "break-even curves" coincide (1970, 66-67).
basically depended upon these two assumptions holding.\textsuperscript{19}

The Heiser, Johnston and R-S analyses could have been improved had those authors ascribed integral frameworks, rather than frameworks involving summations over discrete time periods, to bargainers. For instance, had Heiser used the integral framework, he would have found that the union's indifference curve, \( NB' = 0 \), and the firm's "breakeven curve" generally did not coincide.\textsuperscript{20} Johnston and R-S, on the other hand, need not have assumed that the supplementary functions, \( F(s, w) \) and

\begin{equation}
\frac{\partial^2 E(G)}{\partial s^2} = 0. \quad \text{But substitution of } F(s) = \lambda s^2
\end{equation}

yields

\begin{equation}
\frac{\partial^2 E(G)}{\partial s^2} = -2\lambda p < 0,
\end{equation}

as R-S pointed out (1976, 676). Thus R-S's comparative static results accord with the comparative static results that Johnston derived through a graphic analysis (1972, 846, Figure 4).

\textsuperscript{20}See Figures 1 and 2 above and compare, for instance, the curves \( NEB_0 \) and \( NW_0 \).
H(s), were quadratic functions of s. Increasing costs are a part of the integral object functions for the firm and the union, (1) and (3) respectively, since $T_2$ (or (9)), which appears in (1) and $T_1$ (or (8)), which appears in (3), decrease as s increases.

Because the integral framework is inherently more flexible than the summation framework in a strike-as-an-investment bargaining theory, an integral framework was used above. The models by Johnston and R-S will be presented in an integral framework for comparative purposes.

4. Heiser's theory applies to a union whose members explicitly allow for the wage-employment trade-off (through $\eta$) and whose members jointly seek to maximize the wage bill that they expect to receive (see (7)). The union expects that future product demand, and, therefore, future demand for labour, will remain static. In order to maximize its wage bill and to allow simultaneously for the wage-employment trade-off, the union presumably must be able to restrict the supply of labour to the firm and simultaneously to share employment among its members. This assumption is not very realistic.\(^{21}\) It rarely is fulfilled in practice. Perhaps, the one institutional arrangement that readily conforms with these requirements is the closed shop.

\(^{21}\)A standard criticism of bilateral monopoly models of collective bargaining, like Heiser's, is that the union will not necessarily control the supply of labour to the extent that the monopolist controls the product he sells.
which is coupled with a union hiring hall. It is difficult, however, to conceive of other institutional settings that conform with the requirements that were spelled out above. In short, Heiser's theory seems to pertain to a limited number of institutional settings.

By contrast, Eaton's theory seems to apply to a broader range of institutional settings for collective bargaining than does Heiser's theory. It can be interpreted, for example, as applying to those bargaining relationships where union bargaining committees submit proposed contract settlements to their membership for ratification. Simply put, if the union's membership rejects (accepts) the proposed settlement, it presumably expects (expects not) to achieve a higher wage settlement and it presumably considers, at least implicitly, engaging in a strike to attain such a settlement. The Eaton theory clearly applies to those instances where a union meets a statutory obligation that it conduct a secret strike vote, where the employer's latest wage offer is known to the rank and file. It is argued here that the Eaton model can be imputed to situations where the union does not require a ratification vote or where the mandatory secret strike vote was conducted before negotiations commenced. The union's leaders, several of whom usually serve on the union bargaining committee, presumably attempt during negotiations

\[22\] See, for example, Ross (1972).
to negotiate settlements which will satisfy a majority of the union's members, so that these leaders will either be reappointed in future or be reelected during union elections. In other words, the voting procedure that Eaton's theory embodies in effect constrains the union's leaders and in particular the union's bargaining committee during contract negotiations or renegotiations.

The individual employee in Eaton's theory does not take the wage-employment trade-off directly into account (e.g., through \eta), but he does consider it indirectly through the disengagement coefficient, \tau, as explained above.

On balance, the theoretical framework of Eaton's theory appears to be the more generally applicable union framework for decision-making. Features of both theories were used above in the union decision framework.

5. The firm in Heiser's theory can be considered to minimize the costs, \( L_1^i \) and \( L_2^i \), which follow and which are the continuous time equivalents to \( L_1 \) and \( L_2 \):

\[
L_1^i = \int_{0}^{S} (pQ - w_m L)e^{-\tau t}dt + Q \cdot F(s,w) \quad \ldots (10)
\]

\[23\] However, national or international union representatives who chair union bargaining committees may have a lesser commitment to the members of the local union than do the elected officials of the local, National or International "reps" often are bound, for instance, to promote policies of the national or international union. This includes such policies as male-female wage parity.
where $w_m$ is the market wage rate. We shall now reexpress (1) so that $L_1'$ and $L_2'$ are components of the firm's revised net worth, $NW'$:

$$NW' = \int_0^\infty (pQ - w_m L - H)e^{-rt}dt - L_1' - L_2'$$

$$= \int_0^\infty (pQ - w_m L - H)e^{-rt}dt - \int_0^\infty (w_s - w_m)Le^{-rt}dt$$

$$- \left[ \int_0^s (pQ - w_m L)e^{-rt}dt + QF(s,w) \right]$$

$$= \int_s^\infty (pQ - w_s L - H)e^{-rt}dt - \int_0^s He^{-rt}dt - Q \cdot F(s,w)$$

$$\ldots (12)$$

where

$$NW_n = \int_0^\infty (pQ - w_m L - H)e^{-rt}dt .$$

---

24 Heiser speaks of the worker's opportunity cost. We use $w_m$ as a proxy variable for the worker's opportunity cost and to maintain a general consistency among the theories of A-J, Heiser, Johnston, and R-S. See, for example, R-S, 1976, 670-71, especially n. 2.
Equation (12) clearly is the same as (1) if $F(s,w)$ equals zero. Let $F(s,w)$ equal zero and let us assume that Heiser's firm minimizes (12) subject to the wage decay function (2). $NW_w$, the firm's net worth evaluated at the market wage rate, will remain constant; only $L_1^t$ and $L_2^t$ will change in response to changes in $w_s$ or in $s$. This means that minimization of $L_1^t$ and $L_2^t$ maximizes net worth, $NW'$, in (12). Thus if the Heiser firm's minimized $L_1^t$ and $L_2^t$ subject to (2), this would be equivalent to the A-J firm's maximizing (1) subject to (2).

6. Heiser constructed a dynamic version of his theory where he somewhat arbitrarily converted the breakeven curves for labour and management into time-dependent functions (1970, 68). He then used the dynamic breakeven curves to motivate an explanation of the influence that time-dependent changes either in certain shift parameters or in the supplementary functions might exert on collective bargaining and in particular on the final wage settlement (1970, 68-71).\footnote{Pen, whose bargaining theory of 1952 seems to have been one of the earliest two-sided bargaining theories, also dynamized static equilibrium conditions for labour and management, in order to discuss key factors and their impact on collective bargaining.} However, the outcome of collective bargaining in Heiser's theory "remains obscure," as Johnston noted (1972, 851). Heiser, unlike certain bargaining theorists who preceded him, did not conduct a formal (i.e., mathematical)
Two key features of Heiser's dynamic theory distinguish it from the theories of A-J and Eaton. (1) It is a two-sided theory, in that both labour and management actively pursue their own objectives, and (2) it is basically an indeterminate theory. It is not clear, however, whether or not Heiser's theory gives rise to strike activity.

In conclusion, Heiser's theory is a pivotal theory in relationship to the bargaining theories that preceded it. The main contribution that Heiser's theory made to this literature was that it explicitly incorporated the strike-as-an-investment motive for both labour and management. This meant, in turn, that neither labour nor management submitted to the other side's objectives, as in the A-J and the Eaton theories. But Heiser's theory embodied a serious conceptual mistake. This error stemmed from the discrete time framework that Heiser attributed to bargainers in his theory, and it implied that all strikes should yield non-negative returns to the union.

We demonstrated that in an integral framework, cost-minimizing behaviour by Heiser's firm is equivalent to profit-maximizing behaviour by the A-J firm. A comparison of the union decision framework from Heiser's theory with the employee decision

---

framework from Eaton's theory revealed that the latter had a more general application than the former. We also pointed out that Heiser's theory does not explicitly give rise to strike activity.

Significantly, Heiser's theory does not explicitly embody uncertainty. Johnston, whose model we shall present next, first applied uncertainty to the Heiser framework.

A.4 The Johnston Theory

Johnston set out to correct three deficiencies that he perceived in the Heiser theory. In Johnston's opinion a proper decision analysis should

(i) be probabilistic in character in order to deal with expectations and uncertainty,

(ii) deal explicitly with the *sequential* nature of the bargaining process, in which a wage claim is formulated by the union, a counteroffer is made by the employer, negotiations take place with the possibility of breakdowns, strikes, revised offers and so forth, and

(iii) allow for the possibility of bluffing and second guessing by either party.  

(1972a, 840)

Johnston then structured his model to include the basic elements of Heiser's theory along with features (i), (ii) and (iii).

The assumption that there was uncertainty enabled Johnston to build features (i) and (iii) into his theory. Each bargainer is
assumed to be uncertain about the "bargaining position," thoughts and preferences of the other bargainer. Confronted with this uncertainty, each bargainer ascribes subjective probabilities to possible outcomes to negotiations. Because one side's information about the other side is imperfect, each bargainer may bluff or second guess his opponent.

Johnston carefully distinguished between pre-strike and post-strike negotiations, so that bargaining would be sequential in nature, as (ii) required. He envisaged that the union, just like the union in Eaton's theory, is confronted with a final pre-strike wage offer. The union must decide either to accept this wage offer or to reject it and strike. Johnston also envisages that the interchange of information during both pre-strike and post-strike negotiations will cause both labour and management to revise their perceptions about the kind of settlement that will be achieved and in particular about the other side's attitudes (1972a, 847-50).

Johnston envisions that the firm and the union make their decisions within a three-dimensional space $S \times W \times Z$. $S$ represents the strike length, $s$, whereas, $W$ represents the wage rate, $w$. $S$ and $W$ are random variables and the set of strike length and wage couplets,

27 Either the employer has made a take-it-or-leave-it wage offer or the employer has anticipated that the union has decided to strike if it rejects the employer's next wage offer.
\{(s,w)\}, represents the set of possible outcomes to negotiations. All other variables remain constant in the partial analysis of Johnston's theory. \(Z\) simultaneously represents the firm's (union's) gain function and a subjective probability function, \(p_f(p_u)\), that the firm (union) attributes to the union (firm). (See Figure 1.) The firm's gain function consists of \(L_1\) or (10) and \(L_2\) or (11) which it seeks to minimize. The union seeks to maximize its gain function, \(NB'\), which we convert into an integral format as follows:

\[
NB' = G' - L_0' \\
= \int_s^\infty L(w_s - w_m)(1 - \eta)e^{-jt} dt \\
- [\int_0^s w_m L e^{-jt} dt + L \cdot U(s)]
\]

Here \(G'\) or the left-hand integrand is the integral equivalent to \(G\) and where \(L_0'\) or the term in brackets is the integral equivalent to \(L\).

The probability functions

\[P_i(s,w) \ (i = u, f; \ u = \text{union}, \ f = \text{firm})\]

represent each party's subjective point estimate of the probability that the wage rate, \(w\), and the strike length, \(s\), will be the final
outcomes to collective bargaining. It is critically important that Johnston does not generate or discuss the factors that underlie and determine the shape of the probability functions, $P_i$. Johnston posits that the probability functions, $P_i$, exist and proceeds with his analysis.

The roles that bargainers play in negotiations and decision-making are curiously asymmetrical in Johnston's theory. The firm is the active bargainer: it pursues its own objectives during negotiations. By contrast, the union plays a passive role in negotiations. Its role is similar to, but differs from, the passive role that the union played during negotiations in the Ashenfelter and Johnson theory. The union employs the same decision-making procedure during both pre-strike and post-strike negotiations. However, the decision-making procedure that the firm uses during post-strike negotiations is the first stage of a two-stage decision-making process that the firm uses during pre-strike negotiations.

We shall first present the firm's post-strike decision framework, which will be shown to be equivalent to the A-J firm's decision framework. Next, we shall present the firm's pre-strike decision framework, which includes the firm's post-strike decision framework and which Rabinovitch and Swary adapted for the union in their model. Finally, we shall discuss the union's decision framework, which involves a decision rule that was incorporated into the bargaining model of Chapter 2. We shall highlight Johnston's use
of the probability functions, \( p_i \), because the theory of Chapter 2 refined the \( p_i \) that Johnston introduced into the literature of strike-as-an-investment bargaining theories.

It is my interpretation that Johnston (and Johnston's firm) derived a Hicksian union resistance function from the firm's subjective probability function, \( p_f \). However, Johnston derived it in a rather roundabout manner. First, he implicitly used \( p_f \) to generate a relationship between each wage offer that the firm might make, \( w_f \), and each expected length of strike that the firm estimated would be required for the acceptance of the wage offer, \( s^e \).

\[
\int_0^\infty p_f(s|w_f) \cdot s \, ds = \cdots (13)
\]

where

\[
p_f(s|w_f) = \frac{p_f(s,w_f)}{\int_0^\infty p_f(s,w_f) \, ds}
\]

The expression for \( p_f(s|w_f) \) is the conditional probability density function of \( p_f \) given wage \( w_f \). Unfortunately, Johnson neither motivated nor developed a shape for \( p_f \) in the \( S \times W \times Z \) space. Instead, he finessed the relationship between \( w_f \) and \( s^e \),

---

28See Johnston, 1972a, 843, where he states that "strictly speaking, things cannot be as precise as this diagram [Figure 2 below] implies. For any wage offer, \([w_f]\), the employer will have some subjective probability distribution of the length required to secure acceptance of that offer. The diagram, and the corresponding \([s^e(w_f)]\) function defined in \([(13)]\) above, have to be interpreted as the expected strike length thought to be required for the acceptance of the offer."
Johnston hypothesized that there was an inverse relationship between \( w_f \) and \( s^e \) and that this relationship could be approximated with a linear function:\(^{29}\)

\[
s^e = \delta (w^{\text{urc}} - w_f) .
\]  \hspace{1cm} \ldots (14)

The slope coefficient, \( \delta \), is a constant and given the union's real wage claim, \( w^{\text{urc}} \), it determines the maximum length of strike. Next, Johnston inverted (14). This in effect converted (14) into a wage decay function, such as the one in (2) above. Following Rabinovitch and Swary (1976, 677), we shall simply substitute (2) for (14) in our presentation of Johnston's theory.

The firm minimizes \( L^1 \), or (10), and \( L^2 \), or (11), subject to what amounts to a wage decay function like (2) during post-strike negotiations. We demonstrated above that this procedure was equivalent to the firm's maximizing net worth or (1) subject to (2), provided that the supplementary function, \( F(s,w) \), equalled zero in (12).\(^{30}\) In the latter case, Johnston's firm will determine the same optimal strike-induced wage settlement, \( w^*_s \), and the same optimal strike length, \( s^* \), as the firm in the A-J theory.

During pre-strike negotiations, the employer estimates the subjective probability, \( \pi \), that the union will strike rather than

---

\(^{29}\)See Johnston, 1972a, 843, Equation (12).

\(^{30}\)See pages A-21 and A-22 of this Appendix.
accept a last pre-strike wage offer, call it $w_f$. Johnston argues that "it is plausible to assert that this strike probability [$\pi$] must be inversely related to the size of the offer (1972a, 841)," and that this (cumulative) probability becomes zero at the value of the union's real wage claim, $w^{urc}$. The $\pi$ function is depicted in Figure 8. Johnston approximates the probability function, $\pi$, with a straight line function:

$$\pi = 1 - \beta w_f$$

where

$$\beta = 1/w^{urc}.$$  

It is important to notice that Johnston did not generate $\pi$ from the probability density function, $p_f$, as we might have expected. Rather, he finessed motivating $\pi$, just as he finessed motivating the function, $s^e(w_f)$. It is also significant that $\pi$ depends upon uncertain information, $w^{urc}$, for the $w^{urc}$ that appears in the expression for $\pi$ is the employer's estimate of the union's real claim. As such, Johnston states that $\pi$ is "likely to be especially influenced by evidence of union militancy and by the level of other settlements (1972a, 847)."

The employer uses $\pi$ to calculate real costs during pre-strike negotiations,

$$E(C) = (1 - \pi) L_3 + \pi (L_1^I + L_2^I) \quad \ldots \ldots (15)$$
Legend:

- \( w_f \) = wage offer by the firm
- \( p \) = price of the product
- \( \pi \) = employer's subjective estimate of the strike probability associated with a given wage offer
- \( L \) = labour services
- \( Q \) = output
- \( c_L \) = prime cost (and is evaluated at labour's opportunity cost, \( w_m \))
- \( w_m \) = market wage rate

Sources: Heiser, 1970, 58 - 61
Johnston, 1972, 837 - 42

Figure 8 The Employer's Subjective Estimate of the Strike Probability Associated with a Given Wage Offer and Its Relationship with the Bilateral Monopoly Framework in Heiser's Theory
$L_3 = \int_0^\infty (w_f - w_m) e^{-r t} dt$.

$L_3$ represents the costs that the firm would incur in future, if the union accepted the firm's latest wage offer, $w_f$. $L_1$ and $L_2$ were defined in (10) and (11) respectively. Of course, the firm seeks to minimize expected costs, $E(C)$.

Johnston's firm uses a two-stage procedure, in order to solve for the optimal values, $s^*$, $w_s^*$ and $w_f^*$. It is assumed in the first stage that a strike has taken place. The firm, therefore, applies the post-strike solution technique. This yields the optimal strike length, $s^*$, and the optimal strike-induced wage rate, $w_s^*$. The firm then substitutes $s^*$ and $w_s^*$ into (15) and minimizes (15) with respect to $w_f$, in order to determine the optimal pre-strike offer, $w_f^*$. The estimated optimal pre-strike offer, $w_f^*$, is "the upper limit" to the firm's negotiating range during pre-strike negotiations.

By contrast with the firm, the union in Johnston's theory carries out its decision-making strictly within the $S \times W \times Z$ space, and it uses the same method of decision-making during both pre-strike and post-strike negotiations. The union is assumed to have "conjectured about the nature, but not necessarily the actual results, of the employer's decision-making process (1972a, 848)," but the

---

31 See page A-4 above.

32 See Johnston, 1972a, 848.
converse apparently does not hold. The union in effect attempts to determine (and to settle for) the wage settlement (and, the strike length) that are optimal for the firm. If a strike ensues the union expects a revised offer of $w_f$, after a strike length of about $se'$. This expectation is pictured in the E space in Figure 2.

"[T]here is a non-zero subjective probability attached by the union to each point in the E space," which we have denoted as $p_{uf}$. Each time the firm makes a wage offer, $w_f$, the union decides whether or not to accept that wage offer by applying decision rule zero,

\[
\text{DRO: } \begin{cases} 
\text{If } ER \leq CR, \text{ accept } w_f. \\
\text{If } ER > CR, \text{ reject } w_f.
\end{cases}
\]

where

\[
ER = \int_{E \text{ space}} \int NB'(s,w) p_{uf}(s,w) ds dw
\]

\[
CR = NB'(0,w_f)
\]

and where time zero is the current point in time.

33 In order to make his model seem realistic during post-strike negotiations, Johnston analyses the case where "the optimal pre-strike offer will be less than the optimal strike-settling offer (1972a, 847)." This means that the firm probably will make a wage offer that exceeds its final pre-strike wage offer. However, the other case which is the converse might hold, as well. See Johnston, 1972a, 845-848.

34 See Johnston, 1972a, 848.

35 That this decision rule applies to pre-strike negotiations is clear from the quotation from Johnston (1972, 848) that follows: "If the union has pushed the employer to his sticking point [$w_f$] it should only go on strike if the expected net gain from the strike is at least as great as the certain gain which is currently available to them without a strike." Johnston also envisages that it applies to post-strike negotiations (1972a, 849-50).

36 See Johnston, 1972a, 848-50.
In Johnston's Theory:
\[
\begin{align*}
  z &= NW' \\
  z &= NB' \\
  z &= p_f \\
  z &= p_u \\
\end{align*}
\]

In the Theory of this Dissertation:
\[
\begin{align*}
  z &= NW \\
  z &= NB \\
  z &= p_{nf} \\
  z &= p_{nu} \\
\end{align*}
\]

Additional Legend: E space = the union's expectation about the uncertain outcome to negotiations, should a strike occur

\[s'\]

= the union's subjective estimate of the strike length until a settlement will be achieved

\[w_{e'}\]

= the wage settlement that the union expects that the employer will settle for after a strike of lengths \[s'\]

Figure 9 The Three-Dimensional Space, \( S \times W \times Z \), as it Applies to the Union and the Firm in Johnston's Theory and in the Theory of this Dissertation
The expected returns, ER, are the returns that the union expects to receive from a settlement in the E space. The certain returns, CR, measure the returns that the union would receive from accepting the employer's latest wage offer, \( w_f \). The importance of decision rule DRO is (1) that when the union applies it the union clearly treats the strike-as-an-investment, (2) that it involves probabilities and uncertainty and (3) that it is the kind of decision rule that decision makers will employ in the author's bargaining theory.

The decision framework of Johnston's theory seems to imply that strikes will occur. The union, for instance, will strike according to DRO, if the expected benefits from striking exceed the certain benefits that the union would receive from the firm's final pre-strike wage offer. Unfortunately, since Johnston did not motivate \( p_{uf} \), it is not clear that strikes will occur. It is dubious, however, that the firm will initiate strike action— that is, lock the union out.

In conclusion, Johnston added uncertainty to Heiser's basic framework. He also in effect developed a three-dimensional space, only go on strike if the expected net gain from the strike is at least as great as the certain gain which is currently available to them without a strike." Johnston also envisages that it applies to post-strike negotiations (1972a, 849-50).

\(^{36}\) See Johnston, 1972a, 848-50.
SxWxZ, for modelling the decisions that bargainers make during collective bargaining. Both strike length, s, and wage rate, w, were random variables in this three-dimensional space, and Johnston assigned the subjective probability functions, $P_u$ and $P_f$, to the union and the firm. Each probability function, $P_i$, represented the $i^{th}$ person's subjective probability estimate that $j$ would agree to a strike length-wage settlement combination, $(s,w)$. Properties of the $P_i$ were not discussed. Johnston developed the decision rule, DRO, where the union treated the strike as an investment device. In applying DRO, the union may decide to strike.

Johnston's theory is curiously asymmetrical. The firm's pre-strike and post-strike decision frameworks differ from the union's pre-strike and post-strike decision frameworks. The firm is more or less a perfect mindreader of the union during post-strike negotiations but not during pre-strike negotiations. The firm's post-strike solution procedure is equivalent to the pre-strike solution procedure that the firm applied in the A-J theory. It is subsumed into the firm's pre-strike decision-framework. By contrast, the union has conjectured about the nature but not the exact form of the firm's decision-making process. It uses the same decision framework and, therefore, applies DRO during both pre-strike and post-strike negotiations.

The theory of Rabinovitch and Swary, which we shall next present and criticize, builds from the firm's pre-strike decision
framework in Johnston's theory, whereas our theory will build from the union's decision framework. Both models are designed to convert the Johnston model into a symmetrical model.

A.5 The Rabinovitch and Swary Theory

Rabinovitch and Swary converted Johnston's asymmetrical theory into a symmetrical theory, and they extended Johnston's analysis (1972a, 848-50) of the role that uncertain information and the updating of this information plays in collective bargaining. The R-S theory represents the most recent of a series of two-sided bargaining theories where bargainers ascribe reaction functions to each other and where the interchange of information during collective bargaining generally causes them to revise their expectations. Other theories in this series include the theories of Cheng (1969), Cross (1965), Coddington (1968), and Trifon and Landau (1974).

R-S slightly modified the firm's decision framework from Johnston's theory in order to simplify their analysis. The firm in R-S maximizes (15) subject to a union response function like (2), except that there is "an explicit dependence of the employer's optimal strike length on his assumption about the union real claim (1976, 677)," as follows:

\[ w_u = w^{urc} - \frac{1}{\delta}(w^{urc} - w_m)s \]  

...(16)
where $\delta$ was defined in (14).\footnote{The $1/\delta$ in (16) equals $\delta$ in Equation (17) of the R-S theory (1976, 677).} (16) replaces the inverse of (14).

A key modification that R-S made was that the firm seeks to minimize expected costs, $E(C)$ in (15), during not only pre-strike negotiations but also during post-strike negotiations (1976, 678-79). We infer that during post-strike negotiations the probability $\pi$ becomes the probability that the union will continue to strike if offered the wage offer, $w_f$. This inference seems, however, to have escaped R-S. In any case, the R-S firm applies the solution procedure that Johnston's firm followed in solving (15) subject to (2) when the R-S firm solves (15) subject to (16).

The union in the R-S theory ascribes a probability, $p$, to the firm, and $p$ is the counterpart to $\pi$ in the firm's decision framework. R-S hypothesized that $p$ is positively related to the wage rate, since the firm's objective is to settle for the lowest wage rate. In other words, they hypothesized that the (cumulative) probability, $p$, that the firm will strike rather than accept the union wage offer, $w_u$, presumably will increase as $w_u$ increases.

The union seeks to maximize its expected gain, $E(G^U)$ during both pre-strike and post-strike negotiations:

$$E(G^U) = (1 - p) G' + p L_0' .$$
The gain $G'$ and the Loss $L'_0$ were defined in (13). The union maximizes $E(G^U)$ subject to two conditions: (1) the firm reaction function

$$w_f = w^{Ero} + \psi(w_m - w^{Ero}) s$$

where $w^{Ero}$ is the employer's real wage offer and (2) the probability, $p$,

$$p = \frac{-w^{Ero}}{(w_m - w^{Ero})} + \frac{w_u}{(w_m - w^{Ero})}.$$

The wage, $w^{Ero}$, is the union's estimate of the employer's real wage offer in the three union equations, since it is uncertain information. The coefficient, $\psi$, is a constant whose value is conditional upon the value of $w^{Ero}$. The R-S union follows the same two-stage solution procedure as the R-S firm, to determine the optimal strike length, the optimal strike-induced wage settlement and the optimal final pre-strike wage offer.

Rabinovitch and Swary made at least three contributions to the literature on collective bargaining. First, R-S were able to analyze more formally the updating of information during negotiations than was Johnston, who verbally analyzed the updating of uncertain information during collective bargaining (1972, 842-50). R-S built the uncertain information, $w^{Ero}$ into the firm reaction function and into the $p$ function; they built the uncertain infor-
mation, \( w^{urc} \), into the union reaction function and into the \( \pi \) function, so that they could conduct such an analysis.  

Second, R-S brought several strands of the bargaining literature together in their theory. Their theory was the first theory (i) which was two-sided, (ii) which involved a framework for decision-making under uncertainty (i.e., the taking of expected value), (iii) which explicitly included reaction functions for both the union and the firm, (iv) which was indeterminate, and (v) which explicitly assigned the strike-as-an-investment motive to labour and management. None of the theories by Cheng, Cross or Coddington, for instance, explicitly involved the strike-as-an-investment motive. Although Cheng's theory was two-sided and involved a framework for decision-making under uncertainty, he rather arbitrarily transformed his theory into a deterministic model. Cross' theory, which Coddington later refined, was two-sided; explicitly included reaction functions; generally postulated some mechanism for the adjustment of each bargainer's expectations, as he finds discrepancies between the observed and expected concession rates; and was indeterminate. But Cross' and Coddington's theories involved bargaining over fixed quantities. Trifan and Landau met all the conditions that R-S met,  

---

38 See R-S, 1976, 672-73 and 678-81. Kraus and Melnik also used a strike-as-an-investment bargaining theory to analyze the revising of probability functions which are based upon uncertain information. Unfortunately their theory focussed solely on post-strike negotiations and was one-sided. It amounted to the uncertainty equivalent to Eaton's missing half of the A-J theory.
except that they did not incorporate (ii) into their theory.

Third, the R-S theory is the first strike-as-an-investment theory where *either* labour *or* management can initiate strike action (1976, 678). In other words, it is the first such theory where lockouts can occur.

A.6 Conclusion

We focussed primarily on strike-as-an-investment bargaining theories but we also explained the relationship between these theories and four of the two-sided bargaining theories (the Pen, Cheng, Cross and Coddington theories) that preceded them. We presented several of the strike-as-an-investment bargaining theories in depth. This served three basic purposes.

First, it permitted us to explain some of the interrelationships within this literature for what seems to be the first time. The Heiser theory was seen as a pivotal article in this literature, since it was the first two-sided strike-as-an-investment theory and since Johnston and R-S used the basic Heiser framework in their theories. Significantly, we demonstrated that the firm in Johnston's theory used a solution procedure during post-strike negotiations which was equivalent to the solution procedure that the firm used during pre-strike negotiations in the A-J theory. We also indicated the manner in which R-S built upon the decision framework for the firm in Johnston's theory. R-S transformed the asymmetric structure of Johnston's theory into a symmetric structure.
Second, this review of the literature enabled us to explain the basic conceptual difficulty that underlies the Heiser framework, which Johnston and R-S incorporated into their theories. The discrete framework that these theories embodied in effect meant that strikes were no-loss propositions for the union, but not for the firm. This meant that Johnston and R-S had to rather artificially build the increasing costs of strike activity into their theories; they assumed that Heiser's supplementary functions for the union and for the firm were quadratic functions. The continuous time framework which Johnston's firm employed and which we imputed to Eaton's union was shown to be superior to the discrete time framework as a means for realistically analyzing collective bargaining. In particular, the integral format can be used to analyze the effects of an increase in strike length on the costs to both the firm and the union.
APPENDIX B

THE 1945-75 CHANGES IN THE GENERAL LABOUR RELATIONS LAWS OF BRITISH COLUMBIA

We shall explain in this appendix the evolution and key features of the general labour relations laws of British Columbia from 1945 through 1975. In my opinion, the most important development of this period was the evolution of labour legislation in British Columbia from stressing compulsory, to stressing voluntary, forms of third party intervention. That is, at the beginning of the 1945-75 time period, labour and management were required to submit their interest disputes to compulsory forms of third party intervention, including two-stage compulsory conciliation and government-supervised strike votes, but, by the end of this period, they could elect whether or not to submit their contract disputes to mediators.

The two-stage conciliation process, which was in force throughout over half the 1945-75 time period, consisted of (1) the conciliation officer stage, which was followed by (2) the conciliation board stage. Conciliation officers as well as mediators generally used "accommodative" modes of third party intervention; that is, they try to resolve industrial disputes through the collective bargaining process. Their main tools included persuasion and the negotiating skills they possess. By contrast, most conciliation boards, fact-finding boards and virtually all arbitration boards are "normative"
modes of third party intervention. They are involved in an adjudicative process in which they apply norms and which is outside (and antithetical to) the collective bargaining process. Exceptions can (and do) occur to the compartmentalization of third party intervention that was set out above. For instance, conciliation officers may propose contract settlements and conciliation boards may intercede into the collective bargaining process.¹

The policy shift from compulsion to voluntarism was manifested between 1945 and 1975 in an institutional shift from normative, legalistic forms of third party intervention to accommodative, informal forms of third party intervention. The latter were intended to foster self-reliance and resourcefulness on the part of labour and management in developing their labour relationships. This policy shift applied not only to interest disputes but also to rights disputes.

B.1 The First Post-War Decade of Labour Legislation in British Columbia

The federal Wartime Labour Relations Regulations, which were modelled after the Wagner Act of 1935 in the United States, governed labour relations in British Columbia from 1945 through 1947. The WLRR (or Privy Council Order 1003) embodied two features of

the Canadian interventionist policies which dated to the turn of
the Twentieth Century. First, P.C. 1003 prescribed compulsory two-
stage conciliation procedures as the means for resolving interest
disputes. Second, P.C. 1003 proscribed strikes during the terms
of collective agreements and provided for the levying of fines
against unions and their members for striking illegally. Another
Dominion Order-in-Council, P.C. 7307, stipulated, like contemporary
legislation in the United States, that government-supervised secret
strike votes were a mandatory prerequisite for a lawful strike.

The Government of British Columbia reasserted the control
over labour relations that it had exercised just prior to World
War II in 1947, when it enacted the Industrial Conciliation and
Arbitration Act. The ICAA was patterned on P.C. 1003, but it also
contained certain features from its predecessor act, the Industrial
Conciliation and Arbitration Act, 1937, of British Columbia. The ICAA
carried forward the features of P.C. 1003 that follow: compulsory
two-stage conciliation, a proscription against strikes during the
term, and a provision for the levying of fines against unions and
their members for striking illegally. It also carried forward the
stipulation of P.C. 7307, that mandatory government-supervised strike
votes constituted a prerequisite for a lawful strike.

The decision to carry forward the government-supervised
strike vote provision was a controversial decision (see Anton,
1962, 214-20). The rationale for having government-supervised
strike votes was to avoid the possibility of unions' "rigging" strike votes or of union members' being coerced to vote in favour of striking when they were inclined to vote to the contrary. Thus, it was argued, the presence of government officials at secret strike votes should conduce to a lower incidence of strikes. However, their presence may have had the opposite effect. It may have had the effect of inducing employees to vote in favour of strikes, because the presence of government officials at secret strike votes lent the aura of official government support to the employees' requests.

(See Jamieson, 1962, 416.) Anton, who studied the effect of strike votes on strike activity in the United States, the Canadian federal jurisdiction, British Columbia, and Alberta, concluded that there was an "absence of any real evidence that the number of strikes is reduced by government supervision of voting (1962, 245)." What is important is that there were provisions for government-supervised strike votes in the general labour relations statutes of British Columbia (from 1947 through 1968) and that we tested above, at least indirectly, for their effects on strike activity in British Columbia.\(^2\)

A key feature of the ICAA was that it provided for the establishment of industrial inquiry commissions (or IICs). The

\(^2\)Government-supervised strike votes were voluntary from 1954 through 1968. That is, they took place at the request of either labour or of management. See Labour Relations Act, Statutes of British Columbia 1954, Chapter 17, Section 52 and Mediation Commission Act, S.B.C. 1968, c. 31, s. 70.
ICAA, 1937, but not P.C. 1003, had provided for IICs. IICs have served since 1947 as a "weapon" in the "arsenal of weapons" that the governments of British Columbia could invoke in an attempt at settling either pre- or post-strike negotiations. They typically were used in those disputes, such as industry-wide disputes in the forest products industries, where there was a relatively high degree of public interest. Moreover, IICs constituted a form of voluntary third-party intervention that disputants could request. IICs have been vehicles for high-level mediation as well as for fact-finding.

The ICAA was amended in 1948. Most of the 1948 amendments were cosmetic, altering the drafting of the 1947 Act. However, the 1948 ICAA Amendment Act did add a provision to the 1947 Act which was intended to deter wildcat strikes. The provision permitted the Labour Relations Board of British Columbia to decertify a union whose members had engaged in an unlawful strike. 3

The procedures for two-stage compulsory conciliation that the ICAA and its amendments set out were found to be rigid, prolonged and costly. They required that a conciliation officer and conciliation board intervene into every interest dispute in British Columbia that might culminate in a lawful work stoppage, regardless of whether or not labour or management desired their intervention. Two-stage conciliation procedures extended interest disputes beyond

---

the times when labour or management might have lawfully stopped work in their absence, thereby postponing the effect that the threat of an imminent strike deadline has in generating concessionary behaviour at the bargaining table. Two-stage compulsory conciliation was a rather expensive institution to maintain since it was supported in large part by public funds and since it was not applied either selectively or voluntarily.⁴

Moreover, some experts and laymen questioned the effectiveness of *ad hoc* conciliation boards in resolving interest disputes. They argued that in many cases labour and management should not appear before a conciliation board, following mediation by a conciliation officer--rather that they should be confronted with an imminent strike deadline. It was pointed out that the mandatory establishments of *ad hoc* conciliation boards blunted conciliation officers' effectiveness in resolving disputes, if either or both parties looked beyond the first stage towards the second stage and if either or both parties expected the conciliation board to "split-the-difference" between the positions they presented to the board. In this case, labour and management would "maintain relatively fixed positions" concerning most of their differences during pre-conciliation board negotiations.

⁴See Industrial Conciliation and Arbitration Act, S.B.C. 1947, ss. 65-67 and ss. 27(b), 28, 29(b), 20, and 21 (as amended).
Conciliation board reports were intended to bring public pressure to bear on the parties to settle without resorting to strike action. However, if one side turned down the settlements that the board proposed in its report, the proposed settlement offer became the other side's minimum objective. That each side could use the aura of official sanction that was attached to conciliation board reports may have promoted a higher (rather than a lower) incidence of strikes than would have occurred in the absence of conciliation boards.\(^5\)

Stuart Jamieson probably best explains the experience under the ICAA and the reason it was supplanted in 1954 by the Labour Relations Act (1968, 384-85):

The ICAA, as amended, came into effect during 1948 when industrial conflict reached a low point in British Columbia, as elsewhere in Canada. From then on there was a mounting incidence of strikes in the province, together with a burgeoning list of disputes submitted to conciliation officers and boards under the two-stage procedure required under the ICAA. The administrative and conciliation machinery set up under the Act virtually broke down in the peak year of disputes and strikes in the province in 1952. There was mounting agitation and pressure from prominent business groups and their supporters for new legislation to impose new curbs on the activities of organized labor. British Columbia's labour troubles became a major election issue and contributed to the defeat of the incumbent Liberal-Conservative coalition and the election of the Social Credit government to office in 1952.

---

The Social Credit Government then set about enacting new legislation to replace the ICAA: the Labour Relations Act.

B.2 The Labour Relations Act

The Labour Relations Act, which was enacted in 1954, superseded the ICAA. The LRA essentially represented a redirecting of, rather than an abrupt change in, the labour relations policy of British Columbia. Two key areas which the LRA modified were the areas noted by Professor Jamieson above: the two-stage compulsory conciliation process and unlawful strike activity.

The LRA made the procedures of compulsory two-stage conciliation more flexible than they previously had been. In particular, it permitted conciliation officers to recommend to the minister of labour whether or not conciliation boards need follow their intervention into disputes. More importantly, the LRA permitted the minister of labour three options during the second stage of the compulsory conciliation process. The minister of labour could

(i) order that a conciliation board be appointed;

(ii) instruct the conciliation officer in effect to propose a settlement to labour and management, or

(iii) waive the establishment of a conciliation board.

Strictly speaking, the conciliation officer submitted a report which set out the issues that the parties had and had not agreed upon and which included his recommendation, whether or not a conciliation board should be established. The minister of labour could exercise his discretion, whether or not the conciliation officer's recommendations concerning the matters in dispute should be forwarded to the parties. See Labour Relations Act, S.B.C. 1954, c. 17, ss. 26-31.
Since the minister would not establish a conciliation board automatically, the parties were less certain, for instance, as to the approximate date on which they might face a strike deadline. The conciliation officer's role as intervener was strengthened, for the conciliation officer could threaten, for example, to recommend that the minister not establish a conciliation board. Moreover, because the minister need not forward the conciliation officer's report to the parties if a conciliation board were not established, the parties could not count on using the third party's report as a lever during subsequent negotiations.

The statutory shift of emphasis from conciliation boards to conciliation officers essentially represented an attempt at resolving contract disputes through the collective bargaining process, rather than through an adjudicative process. It is significant that this development in the statutory law of British Columbia preceded the trend, to establish conciliation boards only where they might prove useful, that became the practice in a number of Canadian jurisdictions during the 1960s (see Woods, 1973, 189-191). The compulsory submission of interest disputes to a two-stage conciliation process remained a statutory precondition for a lawful strike or lockout in British Columbia until the end of 1968.

The provisions of the LRA that were intended to deter unlawful strike activity were similar to those of the ICAA, but the actors were different. Under the LRA, the minister of labour
could initiate court action to determine the legality of a strike. If the strike were found to have been illegal, and if the union or its executive were held responsible, then the minister of labour could declare that the union's certificate and/or the collective agreement were null and void. These provisions never were enforced and they did not deter workers from wildcatting (see Jamieson, 1968, 385-86).

There was a rash of wildcat strikes, many of which took place in the construction and forest products industries, during the mid- and late-1950s (see Jamieson, 1962). In response to the outbreak of unauthorized strikes, the Social Credit Government of British Columbia, which had enacted the LRA, enacted the Trade-unions Act, 1959. The Trade-unions Act was an act which supplemented the LRA.

B.3 The Trade-unions Act, 1959

The Trade-unions Act provided even stronger deterrents against unauthorized strikes than the LRA had (see Jamieson, 1968, 386). The Trade-unions Act clearly defined unions as "legal entities" which could be sued (as could union leaders) for any illegal activities that were associated with strikes, picketing or

7Labour Relations Act, S.B.C. 1954, c. 17, ss. 54-55.
boycotts. Moreover, the Trade-unions Act placed upon union leaders the burden of proving that they had not ordered that the members of a bargaining unit which their union represented walk off the job while the contract was in force. (See Carrothers, 1960, 327-29). It also set out the conditions under which courts could issue ex parte injunctions concerning strikes, picketing and boycotts. There were recriminations that the Act had placed unconscionable restraints on the freedom of speech and the freedom of association (see Carrothers, 1960, 342-45). As the courts interpreted the Act, it proscribed all forms of persuasion that were not spelled out in the Act—including such activities as press releases, parades and radio broadcasts (see Hickling, 1975, 56-59).

The Trade-unions Act remained in force from 1959 through 1974 when it was repealed. During the 1959-1974 interim there were three amendment acts to the LRA, which, like the Trade-unions Act, were repealed in 1974.

B.4 The Amendments to the Labour Relations Act

The three amendment acts to the Labour Relations Act were the Labour Relations Act Amendment Acts of 1961, 1968 and 1970. Of course, all three amendment acts included sections which were based upon practical experiences and case law involving the LRA. The

---

amendment acts also were intended to improve the drafting of the LRA.

The LRA Amendment Act, 1961, the longest of the three LRA amendment acts, was comprised largely of changes in the drafting of the LRA. Taken individually, the changes probably were not important changes in the labour relations policy of British Columbia, but, taken collectively, they may have been. For instance, the LRA Amendment Act of 1961 added a provision to the LRA which permitted the minister of labour to inform the parties by written notice (instead of verbally) of his decision not to appoint a conciliation board. This provision was an administrative change whose implementation presumably would expedite, and cause less possibility of confusion in, the dispatching of industrial disputes.9

The two LRA amendment acts of 1963 and 1970 instituted much broader changes in the labour relations policy of British Columbia than did the LRA Amendment Act of 1961. The LRA Amendment Act, 1963 provided a form of third-party intervention into disputes during the term, while the LRA Amendment Act, 1970 instituted the accrediting of employers' associations.

The 1963 LRA introduced methods for resolving disputes during the term and, significantly, these methods were voluntary. One method, intervention by a department of labour field officer,

9See Labour Relations Amendment Act, 1961, S.B.C. 1961, c. 31, s. 20.
was accommodative; the other method, the issuance of a final and binding settlement by the Labour Relations Board of British Columbia, was normative. Prior to the appointment of a private rights arbitration board, either labour or management could request that the Labour Relations Board appoint a labour department officer who would intervene in their dispute "to assist them to settle the difference."\(^{10}\)

Depending upon the nature of the dispute, the Labour Relations Board might decide to settle the difference for the parties. Thus, this provision made outside expertise available to the parties and it provided a means for achieving a speedier resolution of grievances than through the private grievance machinery which the statute required labour and management to establish. The intent of this provision clearly was to provide a government-supplied non-strike means for resolving disputes during the term. Information was not obtained concerning the frequency with which this provision was involved. It is noteworthy, however, that this provision is the antecedent to a similar provision in the Labour Code of British Columbia, which has been used extensively to resolve disputes during the term.\(^{11}\)

The principles and procedures of accreditation that the Labour Relations Act Amendment Act, 1970 established were modelled

\(^{10}\)Labour Relations Act Amendment Act, 1963, S.B.C. 1963, c. 20, s. 3.

after the principles and procedures of certification. That is, the B.C. Labour Relations Board was authorized to determine "appropriate bargaining units" and to issue certificates which conferred exclusive bargaining rights on employers' organizations, just as it was for employees' organizations. The rule governing the issuance of an accreditation certificate was the same as the rule governing the issuance of a certificate to a trade union: majority rules. However, the accreditation process differed from the certification process in British Columbia to the extent that an employer would not be included in an employer's association against his or her will.  

The LRA amendments of 1970 in effect officially sanctioned an ongoing development in which employers formed employers' associations to gain more bargaining power vis-a-vis organized labour, the consequence of which was to increase the concentration and consolidation of the bargaining structure of British Columbia. In other words, the growth in the number of employers' associations which had taken place during the late 1960s was one of the factors which had stimulated the Government of British Columbia to regulate employers' associations through the accreditation process.

Although the accreditation of employers' associations represented a significant change in the labour relations policy of

12 Voluntary membership in an accredited employers' organization is a feature unique to British Columbia, in comparison with the accreditation procedures that exist in Canada's other jurisdictions. (See, for example, Rose, 1975, 105 and 107.) However, once an employer voluntarily joins an employer's association and it is, or becomes, accredited, the employer will encounter difficulty in gaining exclusion from the accredited bargaining unit. (See, for instance, Weiler, 1977, 136.)
British Columbia, the enactment of the LRA Amendment Act of 1970 should not have much impact in the empirical results of this study. The expiry data capture the amalgamation of bargaining units that preceded and came after the enactment of the 1970 LRA Amendment Act. Presumably, it was the changing structure of bargaining and, in particular, the altered power relationships that were associated with the *de facto* amalgamation of bargaining units, more than the change in public policy concerning accreditation, that influenced the parties' proclivity to strike.\(^{13}\)

We shall now discuss two statutes, the Mediation Commission Act and the Mediation Services Act, both of which represented important changes in the public policy of resolving interest disputes in British Columbia.

**B.5 The Mediation Commission Act**

The Mediation Commission Act, which the Social Credit Government enacted in 1968, was one of the most, if not the most, controversial pieces of labour legislation of British Columbia.\(^{14}\)

---

\(^{13}\) The Labour Relations Board determines the appropriate unit for accreditation. The strike-proneness of an accredited employers' association presumably depends on which employers were left in and which were left out of the unit. See Labour Relations Amendment Act, 1970, S.B.C. 1970, c. 16, s. 2.

\(^{14}\) See Plecas (1970), Van der Woerd and British Columbia Institute of Technology students (1972), Jamieson, 1973, 129. See also Nemetz, 1968, whose *Report of Swedish Labour Laws and Practices* was commissioned prior to the enactment of the Mediation Commission Act, for many of Nemetz' recommendations were implemented in the Mediation Commission Act.
Organized labour bitterly denounced the Mediation Commission Act, just as it had bitterly denounced the Trade-Unions Act of 1959. Curiously, the Mediation Commission Act was promulgated at a time when British Columbia was undergoing a period of labour relations tranquility—by comparison with the remainder of Canada, which was caught up, for instance, in the after-effects of the strike wave of 1966.

The Mediation Commission Act functioned in conjunction with the Labour Relations Act as the general labour relations law of British Columbia during the time period the MCA was in effect (1968-1972). The MCA replaced the dispute resolution machinery of the LRA with its own dispute resolution machinery, and the MCA either modified or retained those sections of the LRA that did not regulate collective bargaining.  

The Mediation Commission Act instituted a framework for dispute resolution which resembled the two-stage conciliation procedures of the LRA but which combined elements of both voluntarism and compulsion. The MCA upgraded the conciliation officer positions under the LRA and called them "mediation officer" positions. It replaced *ad hoc* conciliation boards with a *permanent* tribunal, the

---

15 The MCA was amended in 1969, but the purpose of the amendment was to reinstate a feature of the LRA which was not carried forward into the MCA. The feature was that employers, unless authorized to do so, not alter the wages, working conditions or other terms of employment while collective bargaining is taking place (so that they not subvert the collective bargaining process). See Statute Law Amendment Act, 1969, S.B.C. 1969, c. 35, s. 19.
Mediation Commission. The first stage, mediation, was voluntary.\textsuperscript{16} The Mediation Commission, rather than the minister of labour administered the first stage. It assigned mediators and it received their reports, since it was involved in the second stage. The second stage, adjudication by the Mediation Commission, was compulsory—but only compulsory with regard to those disputes to which a mediation officer was assigned.\textsuperscript{17} The settlement that the tribunal proposed was not a binding settlement unless the parties had agreed to be bound by the decision or unless the Government had invoked Section 18 of the MCA. (See Woods, 1973, 172-73.)

Section 18 was the most controversial section of the MCA. It permitted the Cabinet of the Government of British Columbia to compel the parties of an industrial dispute to submit to binding arbitration by the Mediation Commission, if the Cabinet deemed that the dispute threatened the public interest. The legislature apparently intended that Section 18 apply mainly to police, firefighters and British Columbia Hydro employees, but, as it stood in the Act, it could be applied to industrial disputes in all industries or sectors of the economy.\textsuperscript{18} The fear of such compulsory arbitration

\textsuperscript{16} The minister of labour could order that the Mediation Commission assign a mediation officer to a dispute if the minister considered ". . . that the public interest is or may be affected by a dispute." (See Mediation Commission Act, S.B.C. 1968, c. 26, s. 11(2).) The minister only invoked this procedure in 0.3%, 0.8% and 4.6% of the disputes during 1969, 1970, and 1971 to which mediation officers were assigned. (See Plecas, 1972, 72, whose source of information was the Mediation Commission's Annual Reports, 1969-71.)

\textsuperscript{17} See Mediation Commission Act, S.B.C. 1968, c. 26, s. 11 and see, for example, Herbert, 1968, 190.

rankled union leaders and members throughout the Province of British Columbia.

Labour's disappointment with some of the contract settlements that the Mediation Commission first handed down exacerbated its fear that Section 18 would be invoked. The labour movement of British Columbia then launched an assault to discredit the Mediation Commission. Unions, for example, boycotted hearings before the Mediation Commission. The Government undermined the credibility of the Mediation Commission when it appointed special mediators to resolve industry-wide contract disputes in the forest products industry. (Ironically, the Government could not appoint the special mediators as industrial inquiry commissions because the MCA had repealed the section of the LRA that provided for the establishment of IICs).

The New Democratic Party, which traditionally has enjoyed the support of organized labour, defeated the incumbent Social Credit Party in an election held in 1972. The NDP Government made good on its campaign pledge, to repeal the Mediation Commission Act, in late 1972 when it enacted the Mediation Services Act.

The Mediation Services Act disposed of the dispute settlement machinery of the Mediation Commission Act, including the Mediation Commission, and replaced it with a system of voluntary government-supplied mediation. It is significant that there were no more trappings of either two-stage conciliation or of compulsion for resolving interest disputes. (The Mediation Services Act did
permit the minister of labour to prescribe mediation "if he considers that the public interest is or may be affected by a dispute." \(^{19}\)

Like its predecessor, the MSA repealed, modified or retained the sections of the Labour Relations Act that were in effect in 1972, and it operated in conjunction with the LRA.

The Mediation Services Act was supplanted by the Labour Code of British Columbia in 1974. The NDP Government enacted both acts.

B.6 The Labour Code of British Columbia

The Labour Code of British Columbia is said to be one of the most, if not the most, innovative and progressive pieces of labour legislation in North America. \(^{20}\) The Labour Code has roots in Canadian labour legislation, particularly the Ontario Labour Relations Act of 1970, and it is rooted in, rather than alien to, the general labour relations laws of British Columbia. \(^{21}\)

\(^{19}\) Mediation Services Act, S.B.C. 1972 (2nd Sess.), c. 8, s. 10.

\(^{20}\) Paul Weiler, the former chairman of the B.C. Labour Relations Board has stated: "... I think it is fair to say that the new legislation in British Columbia is the most radical and the most controversial step in the recent evolution of Canadian Labour Law (1976, 74)." Charles J. Morris stated that "... British Columbia has truly become a laboratory of bold experiments in labour legislation (1977, 89)."

\(^{21}\) See Arthurs (1974) and Matkin (1975). In order to judge the B.C. Labour Code in relation to general labour relations laws in other Canadian jurisdictions, see, for instance, Bairstow (1977) and International Labour Law Committee, Section of Labour Relations Law, American Bar Association, (1977).
The Labour Code, both in principle and as it has been applied, emphasizes accommodative modes of dispute resolution, but it provides for legalistic solutions to industrial relations problems should accommodative modes fail. The Labour Code, like the Mediation Services Act, calls for voluntary mediation of contract disputes, but also permits the minister of labour to order mediation to protect the public interest. Unlike the MSA, the Labour Code also provides for the establishment of industrial inquiry commissions, if the parties request, or if the minister orders, that an IIC be set up. The Labour Code, like the Labour Relations Act (as amended), sanctions the voluntary mediation of disputes during the term but also permits the Labour Relations Board to adjudicate differences that arise during the terms of collective agreements. The Labour Relations Board has employed the former mode of dispute resolution, for example, to unclog grievance-handling mechanisms, and it has adjudicated those rights disputes which established important precedents (see Weiler, 1976, 79).

Two features of the Labour Code were novel in North American labour laws, and they both reflected the emphasis on accommodation, subject to adjudication as a last resort, that characterizes the Labour Code. One feature is the "special officer;" the other is first contract arbitration.

The special officer is an industrial relations "trouble-shooter" whom the minister of labour selects and on whom are con-
firmed extraordinary powers, such as the power to alter the terms of a collective agreement for up to thirty days. He is deployed in those disputes during the term which are emotionally charged and potentially explosive or which could have long-term deleterious effects on labour relations. The special officer is to endeavour in the first place to effect a negotiated settlement, and it is presumed that the authority which derives from the extraordinary powers of his appointment will increase the likelihood of his attaining a negotiated settlement.\textsuperscript{22}

The provision that the Labour Relations Board arbitrate first contracts is not a provision of general application.\textsuperscript{23} In effect, it constitutes a remedy that Labour Relations Board will exercise if it discovers that first contract negotiations were conducted in "bad faith" and, therefore, constituted an unfair labour practice. Thus, the Labour Relations Board only arbitrated four of some nineteen first-contracts that were submitted to it for arbitration during the first year that the first contract arbitration provision was in force.\textsuperscript{24} The LRB followed its policy of accommodation first, adjudication second by employing mediation-arbitration rather than conventional arbitration to resolve those disputes.


\textsuperscript{23}See Labour Code of British Columbia, ss. 70-71.

Another feature of the Labour Code that was unique to North American Labour Law was the role that it envisaged for the Labour Relations Board with respect to strikes, lockouts and picketing. The courts had been responsible for determining the legality of strikes and lockouts and for granting injunctive relief from unlawful picketing under the Labour Relations Act and the Trade-unions Act, 1959. But the Labour Code rescinded the latter two statutes, and it assigned the Labour Relations Board the responsibility of determining the legality of strikes and lockouts and for granting injunctive relief from unlawful picketing, except where criminal offences occurred. Criminal offences were within the jurisdiction of the courts. The Labour Code provided for the first time in British Columbia for the picketing of "allies" of struck firms and for common site picketing.

In my opinion, the application of these two new concepts probably has only marginally affected the balance of power (i.e., of economic "clout") between labour and management. The B.C. Labour Relations Board has permitted employees who were subject to a "closed" contract to enter a struck common site through a "neutral" or "reserved" gate, as was done in the past. If the ally employs non-union labour, it is not clear that the non-union employees will

---

25 See, for example, Carter, 1976, 6-7 and Weiler, 1977, 66-71, concerning the B.C. Labour Relations Board's policies for dealing with wildcat strikes.
respect a picket line. Ally picketing presumably will be most effective where, say, unionized truck drivers are to deliver materials to the ally's plant or job site.

Most of the original provisions of the Labour Code took effect sometime during 1974 and remained in effect throughout 1975. However, certain sections of the Labour Code were altered by one of the three statutes that amended the Labour Code.

B.7 Labour Code Amendments, Statutes Concerning Provincial Employee Bargaining and the Collective Bargaining Continuation Act

The three statutes which amended the Labour Code were the Statutory Law Amendment Act, 1974; the Essential Services Continuation Act and the Labour Code of British Columbia Amendment Act, 1975. The Statutory Law Amendment Act, 1974 corrected certain drafting errors. The Essential Services Continuation Act, which ended a lawful strike by suburban Vancouver firefighters, modified a few of the sections in the Labour Code that regulated (1) collective bargaining in the essential services and (2) the certification process.

Probably the most important act that amended the Labour Code was the Labour Code Amendment Act of 1975. It modified the

---


powers of the Labour Relations Board, instituted reforms which were intended to make the arbitration of grievances somewhat less legalistic and changed the status of wildcat strikes under the act. There were two changes to the status of wildcat strikes. First, wildcat strikes no longer were classified as unfair labour practices, as they were previously. Hence, the remedies, such as decertification, that applied to the unfair labour practices that the Code defined did not apply to wildcat strikes. Secondly, it was lawful for employees to engage in strikes during the term if, and only if, the reason for the strike was safety conditions.

Three laws other than the Labour Code and the acts that amended the Labour Code were enacted between 1973 and 1975, and these three statutes also embodied the NDP Government's labour relations policy. They were the Public Service Labour Relations Act, the Public Service Labour Relations Amendment Act, 1975 and the Collective Bargaining Continuation Act. The PSLRA granted provincial public servants the de jure right to strike, and it provided for voluntary mediation and voluntary arbitration of interest disputes. The PSLRA Amendment Act, 1975 altered the

---


29 See Labour Code of British Columbia Amendment Act, 1975, ss. 1, 19. It is not clear whether only those employees whose safety is endangered or whether all the employees in the bargaining unit may collectively withdraw their labour services.

30 See Public Service Labour Relations Act, S.B.C. 1973 (2nd Sess.), c. 144, s. 17. The lack of compulsion undoubtedly
drafting of the PSLRA and it altered the bargaining units, called components, that the act set out.  

The Collective Bargaining Continuation Act was *ad hoc* back-to-work legislation that the NDP Government enacted, much to the chagrin of many labour leaders in British Columbia. It ordered strikers in four industries back to work and was the first *ad hoc* back-to-work statute to cover that many industries. The NDP enacted this legislation, in part, because it considered that the protracted shutdowns in the forest products industry and along the British Columbia Railway had caused undue hardship for the public, and that they had produced an unduly large downward multiplier-effect on the economy of British Columbia.

To conclude, the Labour Code and other NDP promulgated labour acts basically embodied a policy of voluntarism with compulsion or adjudication as a last resort. The NDP-promulgated statutes applied the policy of accommodation first and adjudication, if

30(continued) stems from the presence of compulsion in the Mediation Commission that pertained to, but was not applied to the Province's public servants (Section 19).


32See Collective Bargaining Continuation Act, S.B.C. 1975, c. 83. The four industries where strikers were ordered back to work were the propane trucking industry, the pulp and paper industry, the retail and wholesale industry for groceries, and transportation (the British Columbia Railway).
necessary, to both contract disputes and disputes during the term. Novel features of the Labour Code included special officers, first contract arbitration and the Labour Relations Board's issuing injunctive relief concerning strikes, lockouts and picketing.

B.8 A Recapitulation of the Evolution of Labour Relations Policy in British Columbia

Strike waves, shifts in public opinion and changes in government, and perceived deficiencies in labour statutes caused most, if not all, of the changes in labour legislation that occurred from 1945 through 1975 in British Columbia. Compulsion and interventionism were the hallmarks of early post-war labour relations policy. They gave way by the end of the 1945-1975 period to voluntarism and accommodation where adjudication and compulsion were last resorts.
APPENDIX C

DATA

C.1

DATA "British Columbia Strike Data," 1945-75

SOURCE British Columbia Department of Labour, Annual Report and Research Bulletin; plus a confidential source

MANIPULATIONS The data were sorted according to contract status and then worked into series of the monthly, quarterly and annual number of strikes by status. They were also arranged into series of the annual average duration of strikes by status. Each time a multi-year strike surpassed 252 working days it was given that duration and the remainder of the strike was counted in the year that followed. This process was repeated until the number of working days that remained was less than 252. (The number of working days per year was approximately 252 days on average.)

COMMENTS The data were double-checked at the source of collection. They also were double-checked and sometimes checked several times during the coding and key-punching stage. They were rechecked and edited once they were in a storage file in the computer.
APPENDIX DATA (continued): C.2

DATA

"British Columbia Expiry Data," 1945-75

SOURCE

Labour Canada, Collective Bargaining Division

DESCRIPTION

These data, which were collected at the source, are composed of a random sample, an industry collection and a "dead file" collection. The random sample covers over twenty percent of the collective bargaining relationships in British Columbia, some 200 such relationships. The industry collection covers the following industries within the jurisdiction of British Columbia: fishing; mining; forestry, wood products and pulp and paper; and the municipal sector. The so-called dead file collection is composed of bargaining relationships which were active but were terminated in the past. The reasons for "dead" bargaining relationships include decertification of the union, contracting out of jobs, discontinuation of the service provided (e.g., elevator operators), bankruptcy of the firm, and the firms' ceasing to operate. The random sample chiefly was cited in this study.

MANIPULATIONS

The expiry data in the random sample were sorted into number of contracts in force per month, quarter, and year and they were sorted into number of contracts
expiring per month, quarter and year. In determining the number of closed contracts, it was assumed that continuation clauses apply after each contract expires, and reopeners were ignored because the author encountered very rare occurrences where they had been invoked. Master agreements were counted as one agreement and the strike data were adjusted accordingly.

COMMENTS

There were occasional gaps in the expiry data where firms or unions failed to submit their collective agreements. Expiries were imputed in obvious cases where there was a gap and a certain expiry date was customary prior to and after the time gap. Such gaps were picked up in the construction of the contracts-in-force series, as well as in the construction of the expiry series. For this reason, both series understate the number of contracts that were in force at a given point in time. An obvious understatement of these series occurs at each end of the 1945-75 time period. (See Table 25.) The historical data covering the 1940's in particular is relatively sparse. At the other end, quite a few 1975 collective agreements are missing, largely because the establishment of the Anti-Inflation Board in 1975 caused a postponement of bargaining because firms and unions were not familiar with, or were testing, AIB forms and procedures. The expiry data included thirty-six master agreements, of which
TABLE 25
The Annual Number of Expiries and Contracts in Force for the Random Sample and for the Combined Sample: 1945-75

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Expiries**</th>
<th>Number of Contracts**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Combined Sample</td>
<td>Random Sample</td>
</tr>
<tr>
<td>1945</td>
<td>21</td>
<td>7</td>
</tr>
<tr>
<td>1946</td>
<td>35</td>
<td>14</td>
</tr>
<tr>
<td>1947</td>
<td>50</td>
<td>21</td>
</tr>
<tr>
<td>1948</td>
<td>71</td>
<td>27</td>
</tr>
<tr>
<td>1949</td>
<td>85</td>
<td>28</td>
</tr>
<tr>
<td>1950</td>
<td>114</td>
<td>45</td>
</tr>
<tr>
<td>1951</td>
<td>119</td>
<td>51</td>
</tr>
<tr>
<td>1952</td>
<td>134</td>
<td>61</td>
</tr>
<tr>
<td>1953</td>
<td>149</td>
<td>71</td>
</tr>
<tr>
<td>1954</td>
<td>143</td>
<td>67</td>
</tr>
<tr>
<td>1955</td>
<td>143</td>
<td>67</td>
</tr>
<tr>
<td>1956</td>
<td>142</td>
<td>61</td>
</tr>
<tr>
<td>1957</td>
<td>151</td>
<td>71</td>
</tr>
<tr>
<td>1958</td>
<td>183</td>
<td>75</td>
</tr>
<tr>
<td>1959</td>
<td>189</td>
<td>83</td>
</tr>
<tr>
<td>1960</td>
<td>171</td>
<td>67</td>
</tr>
<tr>
<td>1961</td>
<td>212</td>
<td>87</td>
</tr>
<tr>
<td>1962</td>
<td>198</td>
<td>77</td>
</tr>
<tr>
<td>1963</td>
<td>194</td>
<td>75</td>
</tr>
<tr>
<td>1964</td>
<td>177</td>
<td>70</td>
</tr>
<tr>
<td>1965</td>
<td>185</td>
<td>77</td>
</tr>
<tr>
<td>1966</td>
<td>146</td>
<td>54</td>
</tr>
<tr>
<td>1967</td>
<td>172</td>
<td>56</td>
</tr>
<tr>
<td>1968</td>
<td>194</td>
<td>82</td>
</tr>
<tr>
<td>1969</td>
<td>201</td>
<td>91</td>
</tr>
<tr>
<td>1970</td>
<td>199</td>
<td>86</td>
</tr>
<tr>
<td>1971</td>
<td>191</td>
<td>88</td>
</tr>
<tr>
<td>1972</td>
<td>144</td>
<td>77</td>
</tr>
<tr>
<td>1973</td>
<td>216</td>
<td>92</td>
</tr>
<tr>
<td>1974</td>
<td>211</td>
<td>91</td>
</tr>
<tr>
<td>1975</td>
<td>182</td>
<td>86</td>
</tr>
<tr>
<td>1976</td>
<td>171</td>
<td>84</td>
</tr>
</tbody>
</table>

*The combined sample includes 185 contracts from fishing; mining; forestry, pulp and paper and wood products; and the municipal sectors. It also includes all the so-called dead files.

**Aggregated over months.
nine were in construction and five were in retail trade (grocery stores).
DATA APPENDIX (continued): C.3

DATA "Number of New Certifications in British Columbia", 1945-75.

SOURCE British Columbia Department of Labour, Annual Report and Labour Relations Board of British Columbia, Annual Report.

MANIPULATIONS None

COMMENTS The data were divided into the number of first agreement strikes to generate the incidence of first agreement strikes.
DATA APPENDIX (continued): C.4

DATA

"British Columbia Average Weekly Wages and Salaries 1950-75, Seasonally Adjusted".

SOURCE

Statistics Canada, Canadian Statistical Review.

MANIPULATIONS

The original series of data which covered the 1948-75 time period was unadjusted. This series was adjusted through X-11 and then amalgamated into quarterly and annual data.

COMMENTS

Conceptually, it would be preferable to use negotiated wage settlements but such data is not available. Moreover, negotiated wage rates would not be biased the way that this series is biased by the influx and exit of entrants into the labour force or by scheduling arrangements, as the average weekly wages and salaries series was. Moreover, this series includes the wage rates that non-union as well as union members receive. It is anticipated that the seasonal adjustment corrected for some of the irregularities of this series which stem from labour market activity rather than solely from collective bargaining.
DATA APPENDIX (continued): C.5

DATA
"British Columbia Corporate Profit Data (Before Taxes) 1950-75, Seasonally Adjusted.

SOURCE Confidential

MANIPULATIONS The original series extended quarterly from 1966 Q1 to 1976 Q2 and annually from 1960 to 1975. It was backcast through 1950 using Gross British Columbia Personal Income as the predictor. (Gross B.C. Personal Income had proven to be a marginally better predictor of B.C. Corporate Profits than had Individual B.C. Personal Income in Regression Analysis.) Two regression equations were tested for backcasting. One of them involved a linear relationship between the actual values of the two series. The other was linear in the natural logarithms of the two series. (See Table 26.) The formulation that used logarithms resulted in a higher $R^2$ for the annual series. Since the annual series extended further backwards than the quarterly series (1960 versus 1966), the logarithmic formulation was used. (See Table 27.) Quarterly data were backcast on a quarterly basis using the logarithmic formulation, and they were constrained to sum to the annual series, since the annual series commenced prior to

\[\text{Source for Gross B.C. Personal Income and for Individual Personal Income was Statistics Canada, "CANSIM," Matrix Numbers 000556 and 000555 respectively.}\]
TABLE 26


<table>
<thead>
<tr>
<th>Regressors*</th>
<th>PROF (1960-75)</th>
<th>PROF (1960-75)</th>
<th>Ln(PROF) (1960-75)</th>
<th>Ln(PROF) (1960-75)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPI</td>
<td>-</td>
<td>.38** (.02)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>IPI</td>
<td>.14** (.008)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ln(GPI)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.34** (.07)</td>
</tr>
<tr>
<td>Ln(IPI)</td>
<td>-</td>
<td>-</td>
<td>.99** (.05)</td>
<td>-</td>
</tr>
<tr>
<td>I</td>
<td>-20.54 (63.32)</td>
<td>-342.73** (78.41)</td>
<td>-1.90** (.46)</td>
<td>-4.06** (.52)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.96**</td>
<td>.96**</td>
<td>.97**</td>
<td>.97**</td>
</tr>
<tr>
<td>F-Statistic</td>
<td>293.19</td>
<td>308.72</td>
<td>358.48</td>
<td>423.74</td>
</tr>
</tbody>
</table>

( ) denotes T-Statistic

* significant at the 1% level

** significant at the .1% level

† see Nomenclature of Regressors and Régressants
TABLE 27

<table>
<thead>
<tr>
<th>Regressors(^a)</th>
<th>(\text{Ln(Prof}_1)) (1960-75)</th>
<th>(\text{Ln(Prof}_2)) (1960-75)</th>
<th>(\text{Ln(Prof}_3)) (1960-75)</th>
<th>(\text{Ln(Prof}_4)) (1960-75)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{Ln (GPI)})</td>
<td>1.30** (.13)</td>
<td>1.30** (.12)</td>
<td>1.45** (.10)</td>
<td>1.33** (.14)</td>
</tr>
<tr>
<td>(I)</td>
<td>5.25** (1.06)</td>
<td>5.04** (.97)</td>
<td>-6.38** (.86)</td>
<td>-5.37** (1.15)</td>
</tr>
<tr>
<td>(R^2)</td>
<td>.93**</td>
<td>.94**</td>
<td>.96**</td>
<td>.92**</td>
</tr>
<tr>
<td>F-Statistic</td>
<td>101.28</td>
<td>121.75</td>
<td>193.62</td>
<td>91.35</td>
</tr>
</tbody>
</table>

( ) denotes T-Statistic

* significant at the 1% level

** significant at the .1% level

\(^a\) see Nomenclature of Regressors and Regressants
the quarterly series. The residual was distributed evenly across randomly selected quarters.

The series was seasonally adjusted by its moving average with the SAMAQ option of the Time Series Processor computer program.

COMMENTS

The quarterly rankings of profits from highest to lowest was Q2, Q4, Q3, and Q1, with the latter two Quarters' profits being very close in value. The magnitude of fourth quarter profits, in-spite-of Christmas sales, presumably is biased upwards by accountants' conservatism, which translates into their assigning residual profits from the earlier quarters of each year to quarter four's profits. One of the purposes of seasonally adjusting the quarterly profit series was, at the very least, to scale down such over-estimating of fourth quarter profits.

Of course, there is a very high probability that the 1950-59 annual profit series and especially the 1950-65 quarterly profit series will constitute the greatest source of errors in variables in the regression analysis of this study, since they respectively comprise 39% and 62% of the 1950-75 observations.
DATA APPENDIX (continued): C.6

DATA

SOURCE

MANIPULATIONS
The average age of the employed workforce of British Columbia was calculated from data concerning the age composition of the employed labour force of British Columbia. The number in each age category was multiplied by the median age of the corresponding age group, and, summed and divided by the employed labour force.

The data originally were monthly also from 1953 through 1975. However, they included observations for one sample month from each quarter dating from 1945 Q4 through 1952 Q4.

The 1953-75 series was seasonally adjusted using the X-11 computer program. It exhibited a very high degree of seasonal stability. A third degree polynomial regression was used to backcast the seasonally adjusted series over the months from December 1952 back to January 1950. The sample month observations from each quarter prior to 1953 Q1 were used to "tie the regression line down".
DATA APPENDIX (continued)

The newly constructed monthly series from January 1950 through December 1975 was aggregated over quarters and over years.

COMMENTS

The original data comprised several overlapping series. The series selected were consistent with one another in terms of the definition of labour force participation they embodied and concerning the census data they were based upon.

The polynomial regression seemed to give an adequate $R^2$, for the average age of the workforce changed only gradually from year-to-year. There was quite a seasonal component to this series, reflecting ebbs and tides of the labour market. In general, the 1950-52 portion of this series seemed nearly as accurate as the 1953-75 data, but it lacked two observations per quarter. The aggregation to form quarterly and annual series should have smoothed out most irregularities in the 1950-52 portion of this series.
DATA APPENDIX (continued): C.7

DATA
"Unemployment Rate for British Columbia," 1950-75, Seasonally Adjusted.

SOURCE

MANIPULATIONS
The unemployment rate was calculated from measures of number of unemployed and employed members of the Labour Force of British Columbia. The data originally were monthly from January 1953 through December 1975. There generally were observations for one sample month from each quarter dating from 1945 Q4 through 1952 Q4.

The 1953-75 series was seasonally adjusted using the X-11 computer program. A regression line was used to backcast the seasonally adjusted series over the months from December 1952 back to January 1950. The sample month observations from each quarter prior to 1953 Q1 were used to "tie the regression line down."

The newly constructed monthly series from January 1950 through December 1975 was aggregated over quarters and over years.

COMMENTS
The original data was composed of several overlapping series. The overlapping series were checked for consistency concerning the definition of labour force participation they embodied and concerning the census
data they were based upon.

The unemployment rate series was highly volatile, particularly from January 1953 through August 1960. The January 1950 - December 1952 data clearly is less accurate than the January 1953 - December 1975 data. However, the aggregation to form quarterly and annual series should have eliminated certain inadequacies in the 1950-52 portion of this series.
DATA APPENDIX (continued): C.8

DATA "Vancouver Consumer Price Index", 1949-75.


MANIPULATIONS None. The data were tested for seasonal stability on the seasonal adjustment program, X-11, and found not to possess seasonal stability.

COMMENTS The data series will be used as a proxy variable for a British Columbia consumer price index.
APPENDIX D

TABLE 28

Industries Covered by the Entire Sample and by the Random Sample of Expiries

**ACTIVE FILES**

<table>
<thead>
<tr>
<th>INDUSTRY NAME (Standard Industrial Classification)</th>
<th>Number in Overall Sample</th>
<th>Number in Random Sample</th>
<th>Percent of Random in Entire Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>FISHING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>MINES, QUARRIES AND OIL WELLS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metal Mines (052,058,059)</td>
<td>18</td>
<td>4</td>
<td>22%</td>
</tr>
<tr>
<td>Mineral Fuels (061)</td>
<td>4</td>
<td>1</td>
<td>25%</td>
</tr>
<tr>
<td>Non-Metal Mines (except Coal Mines) (071,072,073)</td>
<td>4</td>
<td>2</td>
<td>50%</td>
</tr>
<tr>
<td>Quarries and Sand Pits (083,087)</td>
<td>4</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Services Incidental to Mining (098)</td>
<td>1</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Subtotal</td>
<td>31</td>
<td>7</td>
<td>23%</td>
</tr>
<tr>
<td>MANUFACTURING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food and Beverage Industries (101,102, 103,104,106,107,108,109)</td>
<td>58</td>
<td>10</td>
<td>17%</td>
</tr>
<tr>
<td>Rubber - Plastic (162,165)</td>
<td>4</td>
<td>2</td>
<td>50%</td>
</tr>
<tr>
<td>Leather Industries (172,174,175,179)</td>
<td>4</td>
<td>1</td>
<td>25%</td>
</tr>
<tr>
<td>Textile Industries (182,184,185,186,187)</td>
<td>7</td>
<td>1</td>
<td>14%</td>
</tr>
<tr>
<td>Knitting Mills (239)</td>
<td>2</td>
<td>1</td>
<td>50%</td>
</tr>
<tr>
<td>Clothing Industries (243,244,249)</td>
<td>8</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Wood Industries (251,252,254,259)</td>
<td>22</td>
<td>5</td>
<td>23%</td>
</tr>
<tr>
<td>Furniture - Fixture (261,266)</td>
<td>7</td>
<td>1</td>
<td>14%</td>
</tr>
<tr>
<td>Paper &amp; Allied Industries (271,272,273)</td>
<td>40</td>
<td>10</td>
<td>25%</td>
</tr>
<tr>
<td>Printing, Publishing &amp; Allied (274, 286,287,289)</td>
<td>46</td>
<td>9</td>
<td>20%</td>
</tr>
<tr>
<td>Primary Metal Industries (291,294,295,296,297,298)</td>
<td>14</td>
<td>3</td>
<td>21%</td>
</tr>
<tr>
<td>Metal Fabricating Industries (301,302,303,304,305,306,308,309)</td>
<td>35</td>
<td>7</td>
<td>20%</td>
</tr>
<tr>
<td>Machinery Industries (315)</td>
<td>15</td>
<td>8</td>
<td>44%</td>
</tr>
<tr>
<td>INDUSTRY NAME (Standard Industrial Classification)</td>
<td>Number in Overall Sample</td>
<td>Number in Random Sample</td>
<td>Percent of Random in Entire Sample</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>--------------------------</td>
<td>-------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Transportation Equipment Industries (323,324,326,327,328)</td>
<td>17</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>Electrical Products (331,335,336, 338,339)</td>
<td>10</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>Non-Metallic Mineral (351,352,355, 256,359)</td>
<td>12</td>
<td>4</td>
<td>33</td>
</tr>
<tr>
<td>Petroleum - Coal Products (365)</td>
<td>7</td>
<td>2</td>
<td>29</td>
</tr>
<tr>
<td>Chemical &amp; Chemical Products (372,373, 375,378,379)</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Miscellaneous Manufacturing Industries (392,397,399)</td>
<td>10</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>Subtotal</td>
<td>328</td>
<td>74</td>
<td>23</td>
</tr>
<tr>
<td>CONSTRUCTION INDUSTRY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Contractors (404,406,409)</td>
<td>51</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Old* (404,406,409)</td>
<td>40</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>Subtotal</td>
<td>91</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>TRANSPORTATION, COMMUNICATION &amp; OTHER UTILITIES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation (503,504,507,508,509 512,519)</td>
<td>27</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>Storage (527)</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Communication (544)</td>
<td>3</td>
<td>1</td>
<td>33</td>
</tr>
<tr>
<td>Electric Power, Gas &amp; Water Utilities (572,574,576)</td>
<td>9</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>Subtotal</td>
<td>42</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>TRADE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wholesale Trade (606,608,611,614,616, 619,621,622,623,624,626,629)</td>
<td>70</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>Retail Trade (631,642,652,654,656, 658,676,696)</td>
<td>76</td>
<td>15</td>
<td>20</td>
</tr>
</tbody>
</table>
APPENDIX D (continued)

Table 28 (continued)

<table>
<thead>
<tr>
<th>INDUSTRY NAME (Standard Industrial Classification)</th>
<th>Number in Overall Sample</th>
<th>Number in Random Sample</th>
<th>Percent of Random in Entire Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINANCE, INSURANCE &amp; REAL ESTATE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial Industries (701)</td>
<td>2</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Insurance Carriers (721)</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>COMMUNITY, BUSINESS &amp; PERSONAL SERVICE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education &amp; Rel. Services (802,806,807)</td>
<td>71</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Health &amp; Welfare (821,828)</td>
<td>14</td>
<td>6</td>
<td>43</td>
</tr>
<tr>
<td>Amusement &amp; Recreation (841,844,849)</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Services to Business Management (853, 855,862,864)</td>
<td>7</td>
<td>3</td>
<td>43</td>
</tr>
<tr>
<td>Personal Services (894,879)</td>
<td>16</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Accomodation &amp; Food Services (881,886)</td>
<td>20</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Miscellaneous (891,893,895,898,899)</td>
<td>15</td>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>Public Administration &amp; Defence (902, 931,951)</td>
<td>135</td>
<td>24</td>
<td>18</td>
</tr>
<tr>
<td>Subtotal</td>
<td>284</td>
<td>53</td>
<td>19</td>
</tr>
<tr>
<td>TOTAL</td>
<td>926</td>
<td>188</td>
<td>20</td>
</tr>
<tr>
<td>DEADFILES</td>
<td>120</td>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td>GRAND TOTAL</td>
<td>1046</td>
<td>210</td>
<td>20</td>
</tr>
</tbody>
</table>

Among the dead files the industries include hard rock mining, food and beverages, textile industries, clothing industries, wood industries, printing, metal fabricating, machinery industries, transportation equipment industries, electrical products industries, non-metallic mineral products industries, chemical and chemical products industries, retail and wholesale trade, insurance agencies and real estate industry, education and related services, services to businesses management, laundries, and restaurants.
APPENDIX E
CLASSIFICATION OF REASONS GIVEN FOR WILDCAT STRIKES IN
BRITISH COLUMBIA: 1945-75

1. WAGES (Pay, Fringes and Work Load)
   (a) demands for general wage increases
   (b) demands for wage adjustments
   (c) work-load issues (e.g., amount of work done for a given wage)
   (d) fringe benefits
   (e) wage guarantees
   (f) pensions
   (g) paid holidays
   (h) sick pay
   (i) travel arrangements
   (j) "wages and other issues"

2. COMFORT
   (a) restrooms, work place facilities and other amenities
   (b) meals

3. SAFETY

4. JOB SECURITY
   (a) promotion, reclassification, demotion
   (b) seniority
   (c) redundancy (lay-offs)
   (d) retraining
   (e) down-grading
   (f) technological change
5. DEPLOYMENT
   (a) use of supervisory personnel
   (b) working methods (e.g., reduction in crew size
   (c) amount and quality of supervision

6. DISCIPLINE
   (a) disciplinary matters (employee discharge and employee
       suspension)

7. SCHEDULING
   (a) new schedules
   (b) shift work
   (c) overtime arrangements

8. UNION MOVEMENT
   (a) recognition
   (b) union security
   (c) check-off
   (d) representation and union administration
   (e) employment of particular groups (e.g., non-union workers)
   (f) hiring of additional labour (e.g., contracting out).
   (g) sanction by labour body (e.g., "hot" declaration by
       B.C. Federation of Labour)
   (h) protest of government policy (e.g., re: capital punish-
       ment, hijackings or workman's compensation)
APPENDIX E (continued)

(i) protest of anti-inflation board award or of War Labour Board Award
(j) respecting picket lines
(k) sympathy strike
(l) protesting slowness of negotiations (protest)

9. JURISDICTION

10. CONTRACTUAL MATTERS
   (a) general contractual matters
   (b) grievance procedures
   (c) negotiating procedures (e.g., bargaining authority)
   (d) work study
   (e) local issues
   (f) first contract
   (g) protest slowness of negotiations

11. MISCELLANEOUS
   (a) general grievances
   (b) general working conditions

NOTE: The categories that were presented above are not necessarily mutually exclusive categories. It was attempted that consistency be maintained between the categories presented above and those that Clack used (1975, 7-8). Data incompatibilities meant,
however, that a few sets of categories were created which differed somewhat from Clack's. Jurisdictional disputes, for example, were given a separate category in this study, whereas, Clack buried jurisdictional disputes in a broader category. Two items that I included in (the perpetuation of the) "union movement", items 8e and 8f above, were classified by Clack as "job security" issues which, of course, they are as well.
APPENDIX F

EXPIRIES AND STRIKES IN BRITISH COLUMBIA: 1945-75

Table 25 above presents the pattern of contract expiries in British Columbia from 1945 through 1975. Two sets of expiries patterns are depicted. One is for the entire sample; the other is for the random sample. But both series follow similar patterns. For instance, they both generally increased from 1945 through 1973 and 1974 but dropped somewhat during 1975-76.¹

Observers have pointed out that bargaining cycle in British Columbia consisted of two two-year cycles. One set of collective agreements expired in odd-numbered years while the other one expired in even-numbered years. The pattern that is exhibited in Table 25 seems to be such a pattern of expiries.

A number of three-year agreements were negotiated during the mid-1960s. Their presence is reflected in the figures for expiries in 1966 and 1967. Contracts expirations declined sharply in those two years, as opposed to the years that preceded and followed them.

The number of contracts in force, like the number of expiries, gradually increased from 1945 through 1969 and 1970. (See Table 25.) However, it declined after 1970. Factors which contributed to this decline included (1) the absorption of firm-specific collective agreements into master agreements, (2) the non-renewal of certain collective agreements,

¹ An important reason for the 1975-76 decline in expiries was the establishment of the Anti-Inflation Board in 1975, as explained on page C-3 above.
TABLE 29
The Monthly Pattern of Expiries and of Strikes in British Columbia

<table>
<thead>
<tr>
<th>Month</th>
<th>All Expiries *</th>
<th>Mean</th>
<th>(σ)</th>
<th>All Strikes **</th>
<th>Mean</th>
<th>(σ)</th>
<th>All Expiries ***</th>
<th>Mean</th>
<th>(σ)</th>
<th>All Strikes</th>
<th>Mean</th>
<th>(σ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct.</td>
<td>5.61</td>
<td>(2.7)</td>
<td></td>
<td>Jan.</td>
<td>5.36</td>
<td>(5.3)</td>
<td>Oct.</td>
<td>2.97</td>
<td>(1.9)</td>
<td>Jan.</td>
<td>5.12</td>
<td>(4.9)</td>
</tr>
<tr>
<td>Nov.</td>
<td>4.19</td>
<td>(8.3)</td>
<td></td>
<td>Feb.</td>
<td>4.30</td>
<td>(4.0)</td>
<td>Nov.</td>
<td>1.87</td>
<td>(1.3)</td>
<td>Feb.</td>
<td>3.64</td>
<td>(2.9)</td>
</tr>
<tr>
<td>Dec.</td>
<td>52.19</td>
<td>(26.5)</td>
<td></td>
<td>March</td>
<td>5.03</td>
<td>(4.8)</td>
<td>Dec.</td>
<td>18.16</td>
<td>(9.1)</td>
<td>March</td>
<td>4.68</td>
<td>(4.3)</td>
</tr>
<tr>
<td>Jan.</td>
<td>8.29</td>
<td>(4.2)</td>
<td></td>
<td>April</td>
<td>4.87</td>
<td>(4.7)</td>
<td>Jan.</td>
<td>3.10</td>
<td>(1.7)</td>
<td>April</td>
<td>4.50</td>
<td>(4.4)</td>
</tr>
<tr>
<td>Feb.</td>
<td>15.48</td>
<td>(7.9)</td>
<td></td>
<td>May</td>
<td>5.64</td>
<td>(5.6)</td>
<td>Feb.</td>
<td>5.16</td>
<td>(3.1)</td>
<td>May</td>
<td>5.41</td>
<td>(5.3)</td>
</tr>
<tr>
<td>March</td>
<td>13.61</td>
<td>(6.4)</td>
<td></td>
<td>June</td>
<td>6.54</td>
<td>(5.8)</td>
<td>March</td>
<td>10.74</td>
<td>(5.5)</td>
<td>June</td>
<td>5.58</td>
<td>(4.6)</td>
</tr>
<tr>
<td>April</td>
<td>14.90</td>
<td>(6.0)</td>
<td></td>
<td>July</td>
<td>6.69</td>
<td>(5.3)</td>
<td>April</td>
<td>4.94</td>
<td>(3.5)</td>
<td>July</td>
<td>6.14</td>
<td>(4.5)</td>
</tr>
<tr>
<td>May</td>
<td>5.10</td>
<td>(4.8)</td>
<td></td>
<td>Aug.</td>
<td>5.41</td>
<td>(6.2)</td>
<td>May</td>
<td>4.55</td>
<td>(2.3)</td>
<td>Aug.</td>
<td>4.85</td>
<td>(4.4)</td>
</tr>
<tr>
<td>June</td>
<td>6.16</td>
<td>(10.2)</td>
<td></td>
<td>Sept.</td>
<td>5.07</td>
<td>(3.4)</td>
<td>June</td>
<td>4.16</td>
<td>(2.9)</td>
<td>Sept.</td>
<td>5.00</td>
<td>(3.5)</td>
</tr>
<tr>
<td>July</td>
<td>7.52</td>
<td>(2.6)</td>
<td></td>
<td>Oct.</td>
<td>4.67</td>
<td>(3.5)</td>
<td>July</td>
<td>3.58</td>
<td>(1.9)</td>
<td>Oct.</td>
<td>4.24</td>
<td>(2.8)</td>
</tr>
<tr>
<td>Aug.</td>
<td>7.97</td>
<td>(3.7)</td>
<td></td>
<td>Nov.</td>
<td>3.62</td>
<td>(3.6)</td>
<td>Aug.</td>
<td>3.74</td>
<td>(1.8)</td>
<td>Nov.</td>
<td>3.58</td>
<td>(3.4)</td>
</tr>
<tr>
<td>Sept.</td>
<td>4.94</td>
<td>(2.3)</td>
<td></td>
<td>Dec.</td>
<td>2.22</td>
<td>(1.1)</td>
<td>Sept.</td>
<td>2.42</td>
<td>(1.6)</td>
<td>Dec.</td>
<td>2.24</td>
<td>(1.0)</td>
</tr>
</tbody>
</table>

Correlation Coefficients:

<table>
<thead>
<tr>
<th></th>
<th>Concurrent</th>
<th>Lagged Three Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Expiries</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>All Strikes</td>
<td>-0.715</td>
<td>0.216</td>
</tr>
<tr>
<td>B.C. Expiries</td>
<td>0.927</td>
<td>0.927</td>
</tr>
<tr>
<td>B.C. Strikes</td>
<td>0.733</td>
<td>0.979</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.332</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.229</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.979</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.308</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.000</td>
</tr>
</tbody>
</table>

Legend: *All expiries include the random sample, the industry collections of fishing, forest products, mining and the municipal sector plus the dead file collection. It only pertains the jurisdiction of the Government of British Columbia.

**All strikes include strikes within the four jurisdictions of British Columbia.

***From random sample
(3) the upsurge in 1973 and in 1974 of contract expiries and of contract renewal strikes and (4) the time lag between the actual expiry data and the date on which Labour Canada recorded that expiry. Within the random sample during the 1970s, thirteen contracts were absorbed into master agreements, causing a net reduction of eleven contracts in force; seven collective agreements were not renewed; six contract renewal strikes were associated with changed expiry dates (two in 1972, one in 1973 and three in 1974); and the expiry dates for twenty-five "active" collective agreements were not reported to the original source of the expiry data, Labour Canada (two after 1972, four after 1973 and eighteen after 1974).

Table 29 depicts the monthly pattern of expiries and strikes in British Columbia. The most popular months for contract expiries were December, March and February, with December being the most popular month. The least popular months for contract expiries were September, October and November, the latter month being the least popular one. Given the approximately three-month lag between contract expiry and the commencement of a strike that was found above, collective agreements that expired in September, October or November would give rise to strike activity during the winter months. It clearly is more difficult to strike during the winter months than during, say, the summer months. This fact is reflected in negotiated expiry dates.
TABLE 30

Dummy Variable Schema for Structural Shifts; All Changes in Legislation; Both First Contract Strikes and Contract Renewal Strikes: 1950-75 Quarterly

<table>
<thead>
<tr>
<th>Name of Dummy Variable</th>
<th>Date &quot;On&quot;</th>
<th>Date &quot;Off&quot;</th>
<th>Name of Statute</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA3</td>
<td>1948 Q3</td>
<td>1954 Q2</td>
<td>Industrial Conciliation and Arbitration Act</td>
</tr>
<tr>
<td>DA4</td>
<td>1954 Q3</td>
<td>1961 Q1</td>
<td>Labour Relations Act</td>
</tr>
<tr>
<td>DA5</td>
<td>1961 Q2</td>
<td>1963 Q1</td>
<td>Labour Relations Act Amendment Act, 1961</td>
</tr>
<tr>
<td>DA6</td>
<td>1963 Q2</td>
<td>1968 Q2</td>
<td>Labour Relations Act Amendment Act, 1963</td>
</tr>
<tr>
<td>DA7</td>
<td>1968 Q3</td>
<td>1970 Q1</td>
<td>Mediation Commission Act</td>
</tr>
<tr>
<td>DA8</td>
<td>1970 Q2</td>
<td>1972 Q4</td>
<td>Labour Relations Act Amendment Act, 1970</td>
</tr>
<tr>
<td>DA9</td>
<td>1973 Q1</td>
<td>1973 Q4</td>
<td>Mediation Services Act</td>
</tr>
<tr>
<td>DA10</td>
<td>1974 Q1</td>
<td>1974 Q3</td>
<td>{ Labour Code of British Columbia Public Service Staff Relations Act</td>
</tr>
<tr>
<td>DA11</td>
<td>1974 Q4</td>
<td>1975 Q2</td>
<td>Essential Services Continuation Act</td>
</tr>
<tr>
<td>(I)</td>
<td>1975 Q3</td>
<td>1975 Q4</td>
<td>{ Labour Code of British Columbia Amendment Act, 1975</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Public Service Staff Relations Act Amendment Act, 1975</td>
</tr>
</tbody>
</table>
TABLE 31
Dummy Variable Schema for Structural Shifts; Important Changes and Fewest Important Changes in Legislation: 1950-75 Quarterly

<table>
<thead>
<tr>
<th>Name of Dummy Variable</th>
<th>Date &quot;On&quot;</th>
<th>Date &quot;Off&quot;</th>
<th>Name of Statute</th>
</tr>
</thead>
<tbody>
<tr>
<td>(D_B2)</td>
<td>1948 Q3</td>
<td>1954 Q2</td>
<td>Industrial Conciliation and Arbitration Act</td>
</tr>
<tr>
<td>(D_B3^*)</td>
<td>1954 Q3</td>
<td>1961 Q1</td>
<td>Labour Relations Act</td>
</tr>
<tr>
<td>(D_B4^*)</td>
<td>1961 Q2</td>
<td>1968 Q2</td>
<td>Labour Relations Act Amendment Act, 1961</td>
</tr>
<tr>
<td>(D_B5)</td>
<td>1968 Q3</td>
<td>1972 Q4</td>
<td>Mediation Commission Act</td>
</tr>
<tr>
<td>(D_B7)</td>
<td>1973 Q1</td>
<td>1973 Q4</td>
<td>Mediation Services Act</td>
</tr>
<tr>
<td>(I)</td>
<td>1974 Q1</td>
<td>1975 Q4</td>
<td>Labour Code of British Columbia</td>
</tr>
<tr>
<td>(D_B8^*)</td>
<td>1954 Q3</td>
<td>1968 Q2</td>
<td>Labour Relations Act</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stripes During the Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>(D_E2^{**})</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>(D_E3)</td>
</tr>
<tr>
<td>(I)</td>
</tr>
<tr>
<td>(D_E1^{**})</td>
</tr>
<tr>
<td>(D_E4^{**})</td>
</tr>
</tbody>
</table>

* Substitution of \(D_B8\) for \(D_B4\) and \(D_B3\) yields the fewest important dummy variables.

** Substitution of \(D_E2\) for \(D_E1\) and \(D_E4\) yields the fewest important dummy variables.
### TABLE 32
Dummy Variable Schema for Learning New Rules in One Year; Fewest Important Changes in Legislation: 1950-75 Quarterly

<table>
<thead>
<tr>
<th>Name of Dummy Variable</th>
<th>Date &quot;On&quot;</th>
<th>Date &quot;Off&quot;</th>
<th>Name of Statute</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD2</td>
<td>1954 Q3</td>
<td>1955 Q2</td>
<td>Labour Relations Act</td>
</tr>
<tr>
<td>DD3</td>
<td>1961 Q2</td>
<td>1963 Q1</td>
<td>Labour Relations Act Amendment Act, 1961</td>
</tr>
<tr>
<td>DD4</td>
<td>1968 Q3</td>
<td>1969 Q2</td>
<td>Mediation Commission Act</td>
</tr>
<tr>
<td>DD5</td>
<td>1973 Q1</td>
<td>1973 Q4</td>
<td>Mediation Services Act</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strikes During the Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD2</td>
</tr>
<tr>
<td>DD7</td>
</tr>
<tr>
<td>Name of Dummy Variable</td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>$D_{Q1}$</td>
</tr>
<tr>
<td>$D_{Q2}$</td>
</tr>
<tr>
<td>$D_{Q3}$</td>
</tr>
<tr>
<td>$D_{Q4}^*$</td>
</tr>
<tr>
<td>$D_{Q5}^{**}$</td>
</tr>
</tbody>
</table>

| \multicolumn{3}{c}{Strikes During the Term} |
|------------------------|-----------|-------------|--------------------------------------------------------------------------------|
| $D_{Q1}$               | 1954 Q3   | 1956 Q2     | Labour Relations Act                                                            |
| $D_{Q6}$               | 1959 Q3   | 1960 Q2     | Trade-unions Act                                                                |
| $D_{Q5}$               | 1974 Q1   | 1975 Q4     | Labour Code of British Columbia Act                                             |

* For contract renewal strikes  
** For first contract strikes